JOURNAL OF GAS LIGHTING, WATER SUPPLY, &c.

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EDITORIAL NOTES—GAS, &c.

A Calorific Power Standard.

THE revolution during the last quarter of a century in the methods of utilizing gas, supplemented by the report of the Departmental Committee of the Board of Trade who sat, under the Chairmanship of Lord Rayleigh, to inquire into the testing of gas in London, has directed to an inevitable change in the standard whereby gas is valued and sold, and penalties for deficiency are inflicted in the interests of the public. The first definite move and development in this respect has been made; and no one can disguise the fact, considering what has been going on in the Metropolis during the last four years, that this initial step presages gradual universal application. Before considering, however, what has actually been done, let us dip a little into the history of the events that have led up to the position with which the industry is faced, and which position can be looked upon with perfect composure, seeing that the Gaslight and Coke Company, through the Governor (Mr. Corbet Woodall), have laid a precedent which is fair, and which can be worked to without fear, and without any sacrifice of manufacturing economy.

Careful consideration was given by Lord Rayleigh's Committee in 1904 to the question of whether the increasing proportion in which gas was then being used for heating as compared with illuminating purposes, rendered it desirable that any fundamental alteration of the existing gas valuation and testing requirements should be made—such as the combination of a standard for calorific power with one for illuminating power, or the abolition of the standard for illuminating power and the substitution of a calorific standard. The Committee, however, found that five years ago a considerable proportion of gas was still being consumed in flat-flame burners; and—mark these italicized words—"*while this is the case*," the Committee felt it desirable that testing in respect of illuminating power should still be maintained. The five years that have flown since those days that were epochal in the history of the gas industry, have seen the proportion of gas employed with a naked flame for illuminating purposes gradually lessening, until now Mr. Woodall estimates that, in the area of the Gaslight and Coke Company, 85 to 90 per cent. of the gas sold is consumed for purposes in which calorific power is the essential quality, and not illuminating power. It is evident, from the use, by Lord Rayleigh's Committee, of the words "while "this is the case," that they had in contemplation the eventual complete supersession of the illuminating power test by one for calorific power. Another point that is made equally manifest is that the Committee did not entertain the idea that penalty tests for illuminating power and for calorific power should run concurrently, as, while they recommended the making of official tests for calorific power, they particularly said "not for the purpose of forfeiture," but merely for supplying "a valuable guide for future action." The result was that in the London Gas Act of 1905, it was enacted that the Metropolitan gas examiners, under the instructions of the Gas Referees, should make calorific power tests of the gas supplied for information only. The Gas Referees thereafter prescribed the manner of testing, and Professor Boys designed the calorimeter which was adopted as the standard instrument in making the tests. Testing has proceeded ever since; and, as the Departmental Committee predicted, much valuable information has been collected.

In 1904, in an article in the "JOURNAL," it was remarked that: "It must long before now have been patent to all "interested in the march of progress in the gas industry "that the time was not far distant when the calorific power "of gas would be the supreme quality; that illuminating "power would decline into comparative insignificance; and "that sooner or later calorific power would be the standard "applied, either in substitution of illuminating power, or "to run collaterally with it. The handwriting has been "upon the wall for years, and by many it has not passed un-"heeded." Sir George Livesey, it may be remembered, took exception to this article; but, while ever for the utmost freedom in the gas industry, we could not but recognize that, in a statutorily controlled industry supplying such a commodity as that of gas, one standard test carrying penalties for infraction of prescribed quality would not be displaced by Parliament without another being set up in its stead. Since then there has been in the gas industry a growth of the view that a calorimetric test would be the test of the future; and, from time to time, this fact has been emphasized in these columns. In America, too, the same view has grown; and only in December last, attention was drawn by us to a report of a Committee on Calorimetry of the American Gas Institute, in which the conclusion was presented that the calorimetric method of testing the value of a given gas was decidedly preferable to the photometric method. When commenting on this, it was observed: "There can be no two opinions as "to the correctness of the conclusion; and the only wonder "is that English and American gas undertakings have not "already taken steps to suppress the comparatively useless "periodical testings of illuminating power which are com-"monly made as a control on the quality of their gas."

The calorific test for forfeiture is now being introduced; and it is only the fulfilment of anticipation. But the importance of the matter for the gas industry is indubitably great. The Bill of the Gaslight and Coke Company—for, *inter alia*, the amalgamation of the West Ham Gas Company, and the reduction of the illuminating power of the gas in the Gaslight and Coke Company's area from 16 to 14 candles—is one which is big with significance for the future of Metropolitan gas policy and expansion. To gain the Bill, there has had to be diplomatic action; and the calorific power test was, as the report of the Parliamentary Committee of the London County Council published last week (p. 865) showed, one of the concessions that eventually broke the back of the opposition to the measure. By the agreement with the County Council, the opposition of the City Corporation was likewise cleared from the path of the promoters, and the remaining hostility was vastly weakened. But the calorific power test was not conceded without due thought for the interests of the Company, nor without full recognition of the responsibility of those making it to the whole gas industry, in view of the creation of a precedent that will have considerable influence in future legislation. The Parliamentary Committee of the County Council asked for a standard calorific power of 125 calories net, or (say) 500 B.Th.U.; but those who have studied the official calorific power returns of the County Council (see "JOURNAL" for March 9, p. 688) will have remarked that, while the averages are well above that figure, the minima are somewhat frequently slightly below it. The 125 calories net for 14-candle gas was therefore too stringent. But the parties were in conciliatory mood; and the upshot of the discussion, as seen in the report, was that the Parliamentary Committee of the Council—advised by Dr. Frankland, Mr. Charles Hunt, and Dr. Frank Clowes, the Council's Chief Chemist—accepted 125 calories, the tests being taken on an average of three days, and subject to a margin of 10 per cent. being allowed before any penalty is incurred. In other words, the standard may be construed as being 500 B.Th.U. gross, and 450 B.Th.U. net. A fairly uniform calorific power is what is wanted by consumers in these times; and, even with 14-candle gas tested by the "Metro-"politan" No. 2 burner, there should be no difficulty in sending out gas that will comply both with the standard and with public requirement. There is a condition attached to the agreement, that the whole arrangement in this respect is to be subject to revision by the Board of Trade, on the request of the County Council or the Company, at the end of every three years. Some may think this introduces an

element of uncertainty as to the future. But in it there is protection both for the public and the Company; and the Board of Trade, as an impartial authority, will not make any change from the agreed condition, without the most positive proof that it is desirable.

This is the beginning of a new order of things in gas testing; and, seeing that such a test was bound to come, there is no need, under the circumstances, for regret that it is upon us before it was expected. We should have preferred seeing it introduced in substitution for the illuminating power test; but that would probably have been too radical a change from custom for the authorities to accept just yet. There is, however, no question that the calorific power test will now grow in favour. It is the natural development from the present conditions of gas use; and in proportion to the growth of the test in favour, so will the importance of the illuminating power test diminish, until—it will take years, no doubt—so little will be thought of the latter that it will go the way of most things for which a useful existence can no longer be claimed.

The Gaslight and Coke Bill.

THE Gaslight and Coke Company take prominent place in the editorial columns of this week's issue. This cannot be avoided. Neither the Company nor ourselves can help the falling together of events that are of paramount importance in the week's intelligence, and significant in regard to the future of the gas industry. The Bill which they promoted this session—for the two main purposes of obtaining power to annex (on agreed terms) the West Ham Company's undertaking, and for reducing the illuminating power of the gas in the existing Gaslight area from 16 to 14 candles—has had its preamble declared proved by the House of Commons Committee. The Bill, there is no doubt, is fraught with importance in respect of the future of Metropolitan Gas Supply; and, within the past fortnight, it has matured into something that will, we believe, influence extensively the future of the British gas industry—in that, as pointed out in another article, if the Bill receives the Royal Assent, as there is every prospect now that it will do, it will represent the turning-point in gas testing in this country, by the inclusion of the first calorific power standard for town gas, with penalties attaching for deficiencies. The two chief local authorities in the county—the London County Council and the City Corporation—have been instrumental, by friendly discussion with the Governor (Mr. Corbet Woodall) and other representatives of the Company, in effecting this innovation; and other authorities are certain to follow such a precedent. But in regard to the Bill as a contested measure, it is one of those instances in parliamentary experiences in which the unexpected happens. From the public introduction of the measure, the bold propositions appeared to most people to be just of the kind that would invite close and stubborn resistance on the part of the local authorities, who are not always in the habit of looking at schemes promoted by private enterprise from a larger platform than that planked by established municipal principles, beliefs, and prejudices. We say, quite apart from any personal regard, that the small and shallow opposition (from only authorities in the West Ham Company's supply area) the promoters had, in the result, to meet—opposition destitute of strength and spirit—is a handsome tribute to wise diplomacy, and to the soundness and excellence of the constituent parts of the Bill.

There is little emanating from the proceedings on the Bill to discuss; for, with the exception of the agreement with the London County Council, as published *in extenso* last week, and an agreement made before the Committee to substantially continue the West Ham Gas-Works for a period of ten years, there is—though the measure has expanded in importance—no change in respect of points that were, after a fashion, contested. The West Ham Corporation were the principal opponents; and they were before the Committee asking for impossible things. It was indisputably a proper thing for them, as the local authority, to ensure (though enlightened consideration would have assured them it would follow as a matter of course) that the full amount of the rates from the gas undertaking as it exists should fall to the local exchequer as long as possible, consistent with the economical administration of the gas supply. But it was improper of them not to take, before making their extravagant requests, this last point into account, as representing the gas consumers as well as those who are not. Mr. Corbet Woodall, as Governor of the promoting Company, very promptly agreed to maintain the West Ham works substantially in operation for ten years, without other conditions attaching. But the Corporation, if the members know anything about industry, and the changes to which manufacturing and trading operations are subject, ought to have recognized that the Company could not possibly comply with their suggestion to be bound to keep manual employment on the works in future at the same level as now, nor could the Governor and his colleagues to-day agree to bind those who will be administering the concern ten years hence, under the unknown conditions of the time, to any subjection to the Corporation or the Board of Trade, should it then be desired, for economic reasons, and in the interests of the consumers, to close down the works. The whole proposition, at any rate beyond the ten years, was as absurd and monstrous as would be the suggestion that the Government should engage to submit their policy a decade hence to the arbitrament of an outside body. So it appeared to the Committee, who would go no farther than the concession made by the Governor.

As a matter of fact, the decade's certainty of the continuance of the works in West Ham, with the revenue to the municipal coffers derivable from the rating of the works during that period, probably put the Corporation in quite as good a position in respect of both rates and employment within the area of their jurisdiction as if the West Ham Company survived. The Company some years since bought a site at East Ham on which to develop a new scheme of manufacturing plant; and a commencement with the works would shortly have to be made there. The natural order of things would therefore be the concentration of the Company's works at East Ham, and the gradual closing down of those at West Ham. The West Ham Corporation may therefore congratulate themselves that they are at any rate assured positively of the revenue from the rateable value of the present works for ten years; and the substantial continuance of the works must give confidence that, without stipulation in the Act, employment at them will, during the same period, continue on the normal scale under the circumstances current at any part of the period. At the same time, the gas consumers in West Ham and other parts of the district will be saved the capital expenditure that would otherwise be required in developing the East Ham site; for all accretions of consumption will be met from the excess manufacturing power—principally derived from the modern improved productive ability per unit of plant—that the Gaslight Company have at their works. Having before referred to the economic aspects of the scheme, both from the gas manufacturing and consumers' points of view, this matter does not require to be laboured. The importance of the consideration is manifest to all having technical knowledge of gas supply, though the lay mind may be pardoned for not immediately appreciating it.

The West Ham Corporation were disposed to show some resentment as the proceedings progressed, over the refusal of the representatives of the Gaslight and Coke Company to concede the whole of their demands regarding the continuance of the West Ham works. Their fresh tactics were to oppose amalgamation *in toto*, and to talk of municipal acquisition of the West Ham works. The clause they had already put in indicated the instability and insincerity of the new move. If amalgamation in the municipal opinion is wrong, then the Council ought not to have endeavoured to make any conditional bargains that, if accepted, would have left Mr. Mooney's Committee practically nothing upon which to pass judgment. If purchase in their view is the proper thing, then the Council had no business whatever to have taken the initial steps, through the offer of conditions, in putting themselves out of Court. The Mayor talked glibly but irrationally of a great monopoly being created by the amalgamation; but in gas supply the West Ham Company have at present a monopoly in the district—a monopoly subject to the fierce competition of municipal and rate-aided electricity supply. Supposing purchase, both the gas and electricity supplies would have been, not competitors, but municipal monopolies, and would have been worked as best suited the Corporation and not the patrons of the respective concerns. The people of West Ham have already grave misgivings, hardened by trading deficits, as to the management of the electricity undertaking being of the most circumspect. We cannot conceive what would happen if the West Ham Corporation were also to control the gas undertaking. Happily for the gas consumers, the House of

Commons Committee had no difficulty in quickly probing the Mayor's knowledge and views regarding these questions of amalgamation and purchase. It was clear that, if his personal convictions were settled, they had no foundation from close study and comprehensive investigation of the question. However, there ought to be some acknowledgment to the West Ham Corporation; for the extraordinary weakness of their case enabled the proceedings before the Commons Committee to be considerably curtailed. In fact, the opposition was so speedily exhausted, that what happened would not be misnamed if described as a collapse or a fiasco.

So the Bill providing for this large amalgamation, the unifying of the standard illuminating power of the gas in London, the setting up for the first time of a calorific power standard for town gas, and several other minor matters, goes forward. Is it to be the harbinger of other considerable movements—Metropolitan and general?

The Supply of Shareholders' Lists.

JUST before going to press with the "JOURNAL" last week, judgment was delivered in the appeal by the Gaslight and Coke Company against the decision of Mr. Justice Warrington in the case in which Davies, one of the henchmen of the Company promoter Eaton, pressed for compliance with his rights under section 10 of the Companies Clauses Consolidation Act, 1845, in respect of the supply, under the condition specified, of a copy of the shareholders' address book. Although (as seen by the report published a week ago) the Gaslight and Coke Company have not succeeded, the thanks of the gas industry are due to them for having, at some cost, had the exact legal position of gas companies defined in this matter, and for making an attempt to do something towards clearing the industry of a corrupting growth of late years, and protecting gas shareholders from the attentions of promoters of what Mr. Rowden, K.C., very modestly and with undue courtesy, termed, in the Court of Appeal, "unsubstantial gas and water companies." The Gaslight and Coke Company have made it plain that these promoters, or the dependants who do their bidding, can, by securing a small amount of stock, command a list of shareholders and their addresses on payment of a trifling fee, no matter whether or not the list is required for purposes that are foreign to the peculiar interests of the undertaking concerned and the shareholders. The Company neither in the Court below nor the Court of Appeal could bring out the evidence to show the nature of the "enterprise" in which Eaton and his associates engage. At every turn, they found the way blocked. The Master of the Rolls and the Lords Justices, like Mr. Justice Warrington before them, felt themselves bound by the absolute terms of section 10 of the Act of 1845, and by precedent authority on the point. They had no discretionary power.

Though the dictum of the Courts is that any shareholder, no matter his motive, has the right to inspect and obtain a copy of the list of shareholders, it cannot be supposed that it was present to the minds of the Legislature sixty-four years ago that such use would be made as is now made for purely mercenary purposes by outsiders of the wide terms in which the section was then framed. What is badly wanted is some qualification of the terms of the section in question, in order to give Boards of Directors discretionary powers in the matter of the supply of a list of shareholders, subject always to an appeal, so that a shareholder requiring a list of names and addresses *bonâ fide* in the interests of his fellow-proprietors may not be foiled by the Board of the Company concerned. The present is a monstrous position; but it is one that cannot be dealt with by private legislation. It should therefore be brought before Parliament and the Board of Trade, with the object of inducing the latter to introduce a short amending Act. Meanwhile, the keen wit of the company promoter must be met by the like on the part of Boards of Directors, so as to frustrate the well-planned acts of these operators among the gas investing part of the public. When a list of shareholders, or an amendment of a list, is required, and there is any suspicion (if the application is not directly made) of the company promoter being in the background, then is the time to circularize the shareholders, warning them against having anything to do with gas or water prospectuses inviting applications for fresh issues of capital—no matter how splendid artifice makes the investment appear—until the fullest inquiry has been made respecting the concern, and inquiry not at any of the offices associated with the venture. The fullest wariness is required. It will be noticed that there was no mention in the Court of Appeal of Mr. H. D. Ellis's suggestion as to stockholders being in a different category from shareholders in respect of the application of the section in question. Apparently the suggested differentiation did not commend itself to the legal advisers of the Gaslight and Coke Company.

Stand-by Supplies.

Is it too much to hope that the parliamentary authorities have at length come to the conclusion that there is something anomalous about their treatment respectively of gas and electricity in regard to stand-by supplies? For years we have been contending for the breaking down of the difference established by them between the competing suppliers; and again and again promoters of Gas Bills have inserted clauses to give them protection, but only to have them ruthlessly rejected during the passing of the measures through Parliament. We have never been able to reconcile the two attitudes of the authorities in this matter. Though diligent search has been made within the limits of our opportunities, there has been inability to trace a single instance in which Parliament has refused to insert in electricity measures a clause disentitling a person to a supply of electricity from authorized distributors where he has a separate supply, unless he has agreed with the undertakers to pay them such a minimum annual sum as will give a reasonable return on the capital expenditure and will cover other standing charges incurred by them. But the authorities by a depth of reasoning that we have failed to fathom have always seen fit to deny to gas suppliers the same protection. So far has this preferential treatment for electricity been carried, that the Board of Trade have incorporated a stand-by clause time after time in the General Electricity Supply Bill, which was recently reintroduced under the style of the Electric Lighting Acts (Amendment) Bill. In electric lighting legislation—existing and projected—therefore, there is an amplitude of precedent; and this precedent principally aims at private installations using gas-engines for the generation of electricity.

While the electricity supply industry is protected in this direction against the gas industry, the gas industry asks to be protected in those cases where their supply is merely being used as a stand-by to electricity and to suction and other producer gas plants. There is nothing unfair in this; all that is desired is the extension to the gas industry of the principle that has been applied to electricity. While the justice of this has been accepted by one House, the other has seen fit to find some reason—always invalid—to serve as an excuse for disallowing the protection. It was so in the case of the Mirfield Gas Bill in 1906. In that instance, a Lords Committee agreed to a stand-by clause; but the then Unopposed Bills Committee of the House of Commons dissented, and the clause had to go. Now, however, the Local Legislation Committee of the Commons have turned the tables by permitting the stand-by clause to remain in the Mountain Ash Bill; but the Bill has yet to go through the Lords. It is hoped confirmation will be given through this Mountain Ash Bill to the decision of the Lords in the Mirfield case four sessions ago. Until this is done, the clause at present standing in this Bill cannot, of course, be regarded as a precedent. The same stand-by clause appears in the Heywood Bill of this session, with the slight difference that, in default of any agreement between the consumer and the gas suppliers, the matter shall be determined by a Petty Sessional Court—the Mountain Ash Bill providing for arbitration under the Arbitration Act, 1889. Parliament has seen how the conditions have changed in respect of electricity supply since the 1882 Electric Lighting Act was passed; and it is hoped Parliament will now admit, by the continuance of the clause in the Mountain Ash Bill, that the conditions of gas supply have also vastly changed since the Gas-Works Clauses Act, 1847, and that compulsory supply to all and sundry requires some qualification in the manner suggested.

A Reissue Required, the "Bart." Notwithstanding.

The prominent advertising in the New Toddington gas prospectus of Sir C. B. H. Soame, Bart., as the Chairman of the Water and Gas Debenture and Share Investment Trust, Limited, obviously with the view of inducing the public to subscribe for debenture stock and preference shares, did not produce the desired

effect. The 99, Cannon Street coterie must next go for a Lord, an Earl, or a Duke. Others have done it before. The prospectus in connection with this latest issue was dealt with in our columns on March 16 (p. 763); and the prospectus announced that offers for the debenture stock and the preference shares would be entertained up to March 13. The prospectus was dated March 6; so that it was extremely benevolent of the Directors of the "Trust" to give the public so much time as a week in which to take up these undesirable investments (we had almost written insecurities). But we see that a fresh prospectus has been issued. On the front page the limitation as to time has been withdrawn; and the date of the prospectus, March 6, has been converted into March 13. But towards the end of the document bearing date March 13, we read: "Offers for the shares and debentures, which will be entertained up to the 13th of March next, should," &c. We have had occasion to call attention to the slovenly manner in which, on reissues of Eatonesque prospectuses, the necessary changes are made. Persons receiving this reissued prospectus might be excused for thinking the kindly disposed Sir Charles, and Eaton and the others who are interested, were giving them a whole year in which to make up their minds whether it would be worth while taking up some of these debentures and preference shares.

A Tempting Letter.

A holder of gas stock sends us a letter he has received regarding this issue, from the Water and Gas Debenture and Share Investment Trust, Limited. It is signed by P. Williams, Secretary; and the letter is dated March 17, so that there is further confirmation that the first prospectus was a big failure. The worthy Williams writes:

> We observe you are interested in gas and water investments, and have pleasure in sending herewith particulars of a *sound* investment in gas first mortgage debentures and preference shares, which we offer you at par, and which carry a full quarter's guaranteed interest, payable on March 25 [that is to say, only eight days after the date of the letter]. The yield on the debenture stock at the purchase price is 5 per cent., and on the preference shares over 6 per cent. If you wish to avail yourself of any portion of these, and will let me know by Thursday, 25th inst., I will convey your wishes to the Directors, who meet on that day to attend to applications.

This again is extremely kind; but our correspondent has not, and will not, trouble Sir Charles Soame, Eaton, and others managing the "Trust," with an application. It is again remarked that it is curious that certain shareholders in suburban companies who have received warning from their Boards against these prospectuses have not had copies of the original or reissue of the Toddington prospectus. We can only conclude that the people at 99, Cannon Street are diligent and observant readers of the "JOURNAL;" and that publicity is doing good in the way of protecting gas shareholders against unsubstantial gas and water undertakings.

Lighting Matters in Liverpool.

The extensive character of the operations undertaken by the Gas and Lighting Department of the City of Liverpool is once more shown by the annual report of the Superintendent of Street Lighting, Inspector of Meters, and Gas Examiner (Mr. A. G. Smith), for the year 1908, some extracts from which are given elsewhere in this issue. The work for which the department is responsible is the public lighting; gas and electric meter testing; testing of the gas supplied by the Liverpool Gas Company for illuminating and calorific power, purity, and pressure; testing consumers' gas pipes and fittings; repairing and maintaining the gas-fittings in the majority of the Corporation establishments; and the gas supply to Fazakerley. This is a varied programme; but the report proves that it is carried out with thoroughness. Under the first heading—that of public lighting—it will be noticed that there are close upon 460 miles of streets illuminated by over 19,000 lamps. The part that electricity takes in this enormous system is a small one, especially when it is remembered that the supply of this commodity is in the hands of the Corporation themselves, while the gas is furnished by a Company. The exact figures are: Gas, 453⅜ miles; and electricity, 5⅛ miles. There are 444 miles of street lighted by the best method yet invented for the purpose—namely, that of incandescent gas—only a few of the less important parts being still left with flat-flame burners. The figures with regard to meter testing do not call for any remark. With reference to the testing of the gas, it is stated that a number of carbon monoxide tests were carried out during the year; and communications thereon have passed between the Town Clerk and the Gas Company's Solicitor, "without any satisfactory result." The testing of consumers' gas-pipes and fittings is a branch of work which is not appreciated to the extent that Mr. Smith would like to see; the number of tests in 1908 having been only 175, as compared with 339 in the previous year. Of these, ten resulted in a verdict of "Sound;" while the escapes discovered in the remaining cases were mostly under 1 cubic foot per hour. The examples which are given in the report are of an interesting character, and go to show the varied causes from which escapes are liable to arise. One point in particular may be noted—that taps "are often found without stop-pins to indicate that the gas is properly turned off. The result is that though the light is extinguished the tap is partially turned on again, thus allowing the gas to escape." This is a form of defect which may very easily have far more serious effects than the mere escape of the gas. Rapid progress is being made with the work of supplying gas to the area of Fazakerley. Pending the erection of the works, the Lighting Committee decided to take gas in bulk from the Gas Company; but the erection of the buildings and plant is now in progress, and it is hoped that the works will be completed in time to supply gas in the autumn.

The Association of Municipal Corporations.

There was not very much of a novel character in the proceedings at the annual meeting of the Association of Municipal Corporations, which took place in London last Friday, as is recorded in another column. The Association, like other bodies, find themselves compelled to continually hammer away at subjects on which they desire reform; and, to do the members justice, it must be admitted that one does not perceive any signs of flagging in their attacks. The meetings are always well attended; and, as would be expected from the number of Town Clerks who take part in the proceedings, there is never a lack of fluent speakers. In one thing the Association are particularly fortunate—and that is in their President. Mr. J. Harmood-Banner, M.P., is emphatically the right man in the right place, when he presides over such a gathering as that to which reference is now made. With the fact of his being a thorough-going municipal man, he combines the strength, tact, and knowledge that are requisite for the making of a perfect chairman. It is true, as already remarked, that he did not have anything very new to talk about last week; but what he did say was said well, and it was to the point. The municipalities are having increasing burdens continually placed upon them, and with the suggested alteration of the Poor Laws, which would involve the county boroughs in still further expense, Mr. Harmood-Banner emphatically says must be included a better system of valuation and assessment, and a simplified collection of rates. As to the taxation or rating of ground values, there are, he says, whispers of its coming; and his advice is: "Watch it carefully, and preserve it for the source from which it proceeds—municipal improvement and expenditure." It is the only asset he can see to relieve the rates.

THE LIVESEY MEMORIAL FUND.

WE have received from Mr. Walter T. Dunn the following list of further contributions to the fund:—

1909.		£	s.	d.
March 22	Amount already acknowledged . .	8840	6	1
23	Crewkerne Gas and Coke Company	1	1	0
	Thomas Price, Walton-on-Thames .	1	1	0
	W. H. Y. Webber, Teddington . .	2	2	0
25	William Blair, Helensburgh, N.B. .	1	1	0
	W. W. Hutchinson, Barnsley . .	1	1	0
	T. N. Ritson, London	1	1	0
26	John Baldwin, Gainsborough . . .	1	1	0
	Darwen Corporation	10	10	0
	Thomas Duxbury, Darwen . . .	5	5	0
	Slough Gas and Coke Company . .	2	2	0
27	Bishop's Stortford Gas Company .	5	5	0
	East Cowes Gas Company . . .	3	3	0
	G. Stevenson, Long Eaton . . .	1	1	0
29	Francis P. Tarratt, Darlington . .	1	1	0
	Total	£8877	1	1

GAS STOCK AND SHARE MARKET.

(For Stock and Share List, see p. 938.)

THERE was not much difference between the general position of things on the Stock Exchange last week and that of the week before. The same considerations were working the situation—viz., absolute uncertainty as to the outcome of the Balkan difficulty, which seemed to vary almost from day to day with kaleidoscopic rapidity, and anxiety regarding Home affairs and (chief among these) the Navy. This state of mind kept business down to limited proportions, and movements were very variable. On the opening day, affairs in the East were looking rather brighter, and imparted quite an improved tone. Operators, however, were very cautious and shy, preferring to "wait a bit longer and see;" so business was quiet. On Tuesday came a change for the worse. Anxiety was rife, and everything was dull. Consols led the way down, carrying other markets with them; and the Foreign Market was sensitive. Wednesday was as bad or worse, with intensified alarm at the apparent imminence of belligerent operations. Markets in general were very weak. But on Thursday came relief from the latest intelligence. The apprehension was calmed; and there was something of a sharp movement to get in on good lines at the low prices. The happier feeling prevailed on Friday, and there was a general improvement all round; but just before the close the Foreign Market became a little shaky. Saturday's business was limited, but the tendency was steady pretty well throughout. In the Money Market, rates for short loans were firm until towards the close, when they eased away considerably. Discount was weaker. Business in the Gas Market was lighter generally; but in the issues of the leading Company there was undiminished activity. Movements, too, were irregular, though the ups had rather the best of it. Gaslight and Coke ordinary opened at 101, but at once began to give way, and changed hands at 99½ more than once before the close—a fall of 1. In the secured issues, the maximum was done at from 88 to 88⅝ (a rise of ⅛), the preference at from 104 to 105, and the debenture at from 84¾ to 85¼. South Metropolitan was inclined to rise, marking from 120⅝ to 122; and the debenture was done at 84½ and 84⅝. In Commercials, the 4 per cent. realized 106¾ and 107½, and the debenture 81¾. In the Suburban and Provincial group, Brentford new marked 186¾ and 188, Brighton original 211, British from 42¼ free to 42½, Tottenham "B" 109½, and West Ham 113¼ and 113½. Liverpool "A" had a sharp fall, changing hands at 223. Among the Continental companies, Imperial was quiet and firm at from 182 to 184 (a rise of 1), European fully-paid marked 23¾ and 24⅛, ditto part-paid from 17⅞ to 17⅞, and Tuscan from 8⅞ to 9. Among the undertakings of the remoter world, Buenos Ayres changed hands at 13⅛, Monte Video at 12⅝, Oriental at 140½ free and 141, Primitiva at 6¼, ditto preference at 5⅛, River Plate at 14, ditto debenture at from 96¾ to 97, and San Paulo at 14½.

ELECTRICITY SUPPLY MEMORANDA.

The "Electrical Review" will be Delighted—A Comparison—Five Candles per Cubic Foot an Hour—Corrections—Ancient Testimonials—Public Lighting Statistics.

ONE of the funniest articles we have ever seen on the subject of the cost of gas and electric lighting has appeared in the "Electrical Review." The humorous part lies in the computations by which the costs are contrasted, and in points subsidiary thereto. Before dealing with these, however, there is a portion of the article which supplies us with the seed of hope that a little gentle persuasion will induce the "Electrical Review" itself to take up one of the challenges issued to the electricians to prove, by a practical test, that electricity with the metallic filament lamp is "cheaper than gas." Our contemporary makes reference to the challenge issued in the "Daily Mail" by Mr. F. W. Goodenough, on behalf of the Gaslight and Coke Company, and then offers the following remarks: "We should be delighted to have such a test made under the auspices of some thoroughly independent authority, who might investigate not only the actual relative running costs of the two sources of illumination, but also the equally important questions of the effect of each system upon health, cleanliness, injury to stock-in-trade, furniture, books, picture-frames, &c., safety from accidents by fire, and the best diffusion of light." How easy the delight of our contemporary may be gratified, if prepared to risk, on behalf of the industry to which it is attached, the expense involved by failure to give proof to the postulations of the electricians. It is time these gentlemen did away with pretence, and got to an agreed practical demonstration.

The ludicrous comparisons of the "Review" have been drawn out by an extremely modest calculation of the respective costs of gas and electricity put forward by the Croydon Gas Company. Whoever calculated the figures for the Company, it is plain, purposely refrained from taking full credit for the large margin of advantage gas possesses, and kept well within bounds. The clearest way by far of showing this is to reproduce the figures. The allowance for mantles is generous; an average of three per annum is found to be fair under the maintenance system. The efficiency attributed to the inverted gas-burners does not do full justice. There is a good margin of safety in the 24 candles per 1½ cubic feet for the bijou burner, and the 60 candles per 4 cubic feet for the large inverted burner. Actually the consumption is nearer 3 than 4 cubic feet for 60 candles. Our learned contemporary says that the above tabulated statement requires very important corrections. In the first place, the price of gas should be 2s. 10d. per 1000 cubic feet and not 2s. 8d. Of course, the Croydon Gas Company know less of their own business than the "Electrical Review," and so must not take into account the fact that they reduced the price last October to 2s. 8d.! Then "the *average* cost of electricity (in Croydon) under the maximum demand system is 4d.," so says the "Review." How many consumers get down to this average of 4d.? Very few. The flat-rate in Croydon, according to the "Electrician" tables, is 4½d. per unit. But "the serious error is in the alleged candle power and life of the lamps which are compared."

COST OF GAS AND ELECTRIC LIGHTING PER 1000 HOURS.

One Bijou Inverted Gas-Burner.		*Three 8-c.p. Electric Lamps.*	
1000 hours at 1½ c. ft. = 1500 c. ft. at 2s. 8d.	4 0	1000 hours at 96 watts = 96 units at 4½d.	£1 16 0
Renewals, 4 mantles at 5d.	1 8	Renewals, 3 lamps at 1s.	3 0
24 c.p. costs	5 8	24 c.p. costs	£1 19 0
One Large Inverted Burner.		*Two Osram Lamps.*	
1000 hours at 4 c. ft. = 4000 c. ft. at 2s. 8d.	10 8	1000 hours at 70 watts = 70 units at 4½d.	£1 6 3
Renewals, 4 mantles at 6d.	2 0	Renewals, 2 lamps at 4s.	8 0
60 c.p. costs	12 8	60 c.p. costs	£1 14 3

In the paragraph setting right (it is assumed) one of the serious errors, ignorance and comicality swell in amazing style. With pompous dogmatism, our contemporary writes: "The inverted gas mantle under actual working conditions, if renewed every six weeks, will not give a mean candle power of over 20 candles; and the cost works out per 1000 hours as follows:—

$$\frac{1000 \times 20}{32 \times 4} = 156 \text{ candle-power-hours for 1d.}$$

The metal filament 35-watt lamp gives 30-candle power, and working out similar calculations—

$$\frac{1000 \times 30}{4{\cdot}5 \times 35} = 190 \text{ candle-power-hours for 1d.}"$$

Now our contemporary, in fairness, must tell us the names of those inverted lamps that will only give a mean candle power of 20-candle power per 4 cubic feet of gas consumed, with the mantles renewed every six weeks. Does not the writer of this nonsense in the "Review" appreciate that his figures, if they mean anything at all, only allows, using an inverted gas-burner, an efficiency of 5 candles per cubic foot of gas consumed per hour? Perhaps the "Review" will invite us to witness similar tests to those on which these figures are based. We claim that a properly regulated inverted burner will render, with gas such as that supplied at Croydon, a light of 20 candles per cubic foot of gas. If, however, we only take the modest 15 candles per cubic foot suggested by the Croydon Gas Company, we convert the first calculation into

$$\frac{1000 \times 60}{32 \times 4} = 468 \text{ candle-power-hours for 1d.}$$

as against the 190 candle-power-hours for 1d. with the metallic filament lamp; or if we take 20 candles per cubic foot with a good modern regulated inverted burner, we should get

$$\frac{1000 \times 80}{32 \times 4} = 625 \text{ candle-power-hours for 1d.}$$

Or a pennyworth of gas for a light of 80-candle power would last nearly eight hours, as against the two-and-a-half hours allowed by a pennyworth of electricity at 4d. per unit—80 candles × 1·25 watts per candle = 100 watts per hour, or 250 watts in two-and-a-half hours. But the "Review" says that, "under any circumstances," the electric lamp is the cheaper; so what is the good of saying anything more, especially as the credentials to authority obtrude themselves in the assertion as to the efficiency of the inverted gas-burner being equal to 5 candles per cubic foot! "The life of an inverted gas-burner is alleged," says the same anthority, "to be 250 hours." No, Mr. "Review" editor, that is not so. The life of an inverted gas-burner is measured by years—not hours; and the life of a decent mantle, if not subjected to violence, is measurable by that of the Osram lamp. We have had inverted mantles that have been in use for fully a year. It is admitted that this is an extraordinary length of use; but it shows what can be done by the exercise of simple care. The four mantles allowed per 1000 hours by the Croydon Gas Company is more than generous; and it is a figure, as we have said, that permits a good margin of safety. The "Review" has fallen into the absurdity, too, of quoting 2000 hours—this is a claim of quite recent birth—as the average life, in everyday use, of the Osram lamp. With certain installations under observation—shop and private—we say positively the 2000 hours is not true. It is also averred by the "Review" that the "gas mantle rapidly deteriorates." Does our contemporary mean that the constituents of the mantle deteriorate? Just consider what are those constituents before replying, Mr. Editor, because we have a fancy for learning more from the fount of wisdom whence the article in the "Review" issued, upon which article we have ventured to make a few comments, and should like to make a few more on receiving further information.

In another part of the same number, the "Electrical Review"

gives a list of testimonials from a number of electricity consumers, very much after the style of the testimonials issued to the public as to the wonderful efficacy of certain curative syrups, pills, corn cures, and so forth. The letters are dated 1902, with the exception of one that goes back to 1894. There is no information given in these testimonials to judge of how far the writers are comparing on an equal illuminating basis; and it is absolutely certain they are not making comparison with the modern gas-burner. But our learned contemporary states that, when these letters were written, gas of better quality was being supplied than at the present time. May we venture to ask what is meant by gas of "better quality?" Does it mean gas of better illuminating power or of better calorific power? We should like to know, because then there will be a clearer understanding as to where our omniscient contemporary is. Hertford, Barnet, Lewes, Weston-super-Mare, and Sutton (Surrey), are mentioned as places from which testimonials were received. Now will the "Electrical Review" kindly tell us, when answering the above questions, how many and which of the gas authorities in the towns in question have, since 1902, obtained parliamentary authority to recede in any way from the prescript for quality previously standing in their Acts of Parliament? We are sorry to put so many questions, but it will not absorb much additional time to satisfy our curiosity as to why, with electricity so cheap (according to these testifying consumers, some of whom may have a close interest in electricity supply), the electricity undertakings in the towns named have not made greater progress since 1902? If there are so many inquiries in this paragraph that they overwhelm our journalistic friends, then we will ask them to specially address themselves to those referring to the quality of gas. It is hoped that our interest in the matter will be gratified; anyway an answer would afford us an opportunity for making some further references to the subject. It will be seen on p. 902 that the testimonials published by our contemporary have been the subject of a little private inquiry.

A fortnight ago reference was made to a report that Mr. H. F. Street, the Borough Electrical Engineer of Southampton, had presented to the Corporation of Southampton, on the subject of public lighting by electricity; and a few questions were put by us to that gentleman which he has not yet ventured to answer. In his report, he made use of a table compiled by the City of Leeds Distribution Department, dated Feb. 4, 1908, and referring to the position of electric lighting in certain towns. Some well-disposed correspondent has sent us the lines of the table alluding to the more important towns. These are: Brighton, Bristol, Bournemouth, Croydon, Cardiff, Derby, Edinburgh, Glasgow, Hastings, Liverpool, City of London, Battersea, East Ham, St. Pancras, Manchester, Portsmouth, Southampton, Sheffield, and York. The first question is: "Have you adopted electric lighting, and to what extent?" As in all the cities and towns named above, with the exception of the City of London, the Corporations are the owners of the electricity undertaking, it is not surprising to see the question answered in the affirmative, with figures showing the extent of the adoption of electric arc and incandescent lamps in their respective columns. But it would be interesting if Mr. Street would explain to his Committee why Liverpool has only in use 180 arc lamps and ten electric incandescents in the streets, why Manchester has only 94 arc lamps in use, and why Sheffield has only 20. Under the Liverpool figure are the words "six miles." Why did not Mr. Street supplement this by stating the mileage of the streets lighted by incandescent gas-lamps?

The next question in the table is: "Has there been any extension of electric lighting within the last two years?" Bournemouth, Liverpool, and East Ham say "No;" the remainder "Yes;" but few give information as to the extent. The third question is: "Has the adoption of electric lighting displaced gas lighting, and to what extent—(*a*) flat-flame, (*b*) incandescent?" Under flat-flame lighting, the replies are, as would be expected, unanimously in the affirmative. Under incandescent gas-lighting, Brighton, Bristol, Liverpool, say "No;" the others "Yes;" but only three indulge in figures. At Bournemouth, it is stated, the arc lamps in use are switched off at 11.45, and incandescent gas-lamps are then lighted. At Croydon, during the two years preceding the date of the report, only 20 gas-lamps were displaced! At Hastings, it is reported that "the adoption of electric arc lighting has displaced on an average three incandescent gas-lamps to one electric lamp." Alas! poor Hastings. At what cost per mile? And what about the refusal of the Local Government Board to grant more money for the purpose; and what about the deficits on the electricity supply undertaking? In connection with the City of London, it is stated, under electric light extensions, that 70 arc lamps have been installed. We should like to know where, and if in substitution of gas or other electric lamps? It is within our knowledge, and that of Mr. Street, that a number of arc lamps have been displaced by gas lighting in the City in quite recent years. It seems to us a silly question to ask, "Has the adoption of electric lighting displaced gas lighting and to what extent?" inasmuch as electric cables are not as a rule run to the outskirts of a town for the supply of virgin areas. Equally stupid is the question, "Has the adoption of incandescent gas lighting within the last two years displaced electric lighting, and to what extent?" Is it likely that Corporations owning electricity undertakings would, after spending heavily, and sometimes recklessly, on installing electric lamps, clear these out, and replace them by incandescent gas-lamps, though they might save money for the ratepayers or the electricity undertaking by so doing.

NOTES FROM WESTMINSTER.

If for no other reason than that the Gaslight and Coke Company's Bill has passed Mr. Mooney's Committee with the exception of the adjustment of clauses, the past week may be described as an eventful one in the annals of gas legislation. There is much about the Bill in its modified and extended form—modified and extended through agreement with the London County Council, and by concession before the Committee—that is of immense importance to the gas industry, Metropolitan and general. The Heckmondwike and Liversedge Gas Bill has been disposed of by Lord Kintore's Committee, and the Local Legislation Committee have passed the first Bill—that of the Mountain Ash District Council—in which there has been any interest in connection with gas. A few Water Bills have also gone forward from the first Committee stage. Another Commons Committee were meeting on Thursday, with Mr. Rose in the chair. In the group of Bills referred to their scrutiny are both gas and water measures—among them the two promoted respectively by the Aldershot and Yorktown Companies, in which, among other requirements, electric lighting powers are being asked for. On Thursday, there was some discussion *in camera* as to the postponing of these measures until after Easter; and now April 21 has been fixed as the day for commencing their discussion. There has been some inquiry, too, as to what is being done in the matter of the Alliance and Dublin Consumers' Gas Bill. The position up to last Friday was that it had been read the first time in the Lords, and had been referred to the Examiners. Probably, too, it is waiting for the meeting of shareholders to be held to-morrow. There is not a great deal doing in the Committee-rooms; and there will not be much more this side of the Easter recess.

The Gaslight Bill Succeeds.

The Gaslight Bill has increased in importance since it was introduced; for, under the agreement with the London County Council and the City Corporation, among other things, a calorific power standard (as referred to in our editorial columns) is to be inserted, and 1d. is to be relinquished from the standard price of the Gaslight Company, making it 3s. 2d., instead of 3s. 3d., or 3s. 4d. as it was before meter-rents were re-imposed. The Bill came before Mr. Mooney's Committee on Thursday; and it is due to the business capacity of that gentleman, and the ability with which he clearly grasped the points for judicial consideration, that the proceedings on the Bill were as short as they were, and that the weakly opponents were firmly but courteously told that they had presented a very indifferent case. The withdrawal of the County Council, the City Corporation, and other authorities, took away the props that the West Ham and East Ham authorities would otherwise have enjoyed; and now that the best of what they could find to say in opposition to the Bill has been heard, it can only be concluded that a little more discretion and reasonableness on their part would have completely annulled the whole of the cause for appearance, and allowed the Bill to go forward as an unopposed measure. All that was reasonable in what the opponents wanted it was so clear was open to private agreement that the talk there was before the Committee round about the points, was a sheer waste of time. The weakness was apparent from the moment the cross-examination of Mr. Corbet Woodall was completed.

The Proceedings.

Mr. Balfour Browne, K.C., had with him for the Bill Mr. Danckwerts, K.C., Mr. Honoratus Lloyd, K.C., Mr. R. Neville, and Mr. Davidson. With his usual lucidity, Mr. Balfour Browne soon placed the Committee in possession of the objects of the Bill—the two principal being the fusion with the promoting Company of the West Ham Company, and the lowering of the illuminating power standard of the gas in the Gaslight Company's area—and the economic advantages of what was proposed. He spared the Committee trivial detail, as well as the narration of the long history and extensive operations and development of the promoting Company. The Governor of the Company (Mr. Corbet Woodall) was called as first witness; but it was a simple matter examining him upon the questions raised in the petitions. He was followed by Mr. J. Lister Godlee, the Chairman of the West Ham Company; and it was not necessary to detain him long in the chair. Then Mr. H. E. Jones was called; but after the first two or three questions, the Chairman was quite satisfied that he and his colleagues were in complete possession of the facts of the case, as far as it was necessary to inquire into them, having regard to the agreements already effected. The case for the promoters was very properly prepared, and the necessary backing arranged for, on the assumption that the opponents, if they all appeared, would make a formidable array. Cutting off Mr. Jones, and the promoters wisely abstaining from forcing more evidence upon the Committee than they wished for, the other witnesses retained—Mr. E. H. Stevenson, Mr. Arthur Valon, and Mr. William Cash—were not called, nor were any of the chief officials of the Company, among whom were noticed Mr. D. Milne Watson (the General Manager), Mr. H. Rayner (the Secretary), and Mr. T. Goulden (the Chief Engineer). The opponents only called the Mayor of West Ham (Mr. A. W. Littler) as a witness; and, as a matter of fact, it was not clear what he wanted. He talked vaguely about purchase by the Corporation, and did not like amalgamation with the Gaslight and Coke Company because it would create a large "monopoly." But he was willing, in accordance with the terms of a clause put before the Committee earlier by Mr. Freeman, K.C., to shake hands with the Gaslight and Coke

Company if they would bind themselves to keep open and fully use the West Ham works for ten years, continue the same number of employees, and not close down after the decade without the consent of the Corporation, or, in the event of this being thought to be unreasonably withheld, by a favourable decision on reference of the dispute to the Board of Trade. These points are discussed elsewhere in the editorial columns, and so may be dismissed here, after saying that it would have been impossible for those responsible for the management of the concern to-day to bind themselves to anything longer than ten years and a substantial working of the plant. Mr. Freeman argued that the amalgamation was not in the public interest. The suggestion was a broad one; the argument in its support about as narrow as it well could be. Amalgamation of the two Companies appears from a critical examination of the conditions to-day to be decidedly in the public interest. The West Ham Corporation, of course, wanted to perpetually keep the works in their midst, so as to enjoy the revenue in the shape of rates; but this is a condition that would not be assured to them if the West Ham Company continued in existence, as the site the Company acquired some time ago for their future works is in East Ham. The whole proceedings only lasted over an abbreviated sitting on Thursday and a short one on Friday—there being absolutely nothing but conditions to fight about. The result was exactly what was anticipated. The preamble of the Bill was declared proved; and the clause presented by Mr. Freeman to the extent that the Governor of the Gaslight Company had consented to adopt it—viz., to keep the West Ham works substantially in use for ten years, without further stipulation—was ordered to be inserted in the Bill. Territorial definition is to be given to the West Ham area in the Bill, in order to remove any ambiguity in which the Ilford Gas Company discern danger. That is all. What was expected to be the big fight of the session has fizzled out to almost nothingness; but in importance the measure has grown. Clauses are not to be taken before next Thursday morning, as there is a fair amount of drafting to be done and agreed upon in order to meet the various matters that have been the subjects of arrangement.

A Suspensory Clause. By the proceedings before the Earl of Kintore's Committee on the Heckmondwike and Liversedge Gas Company's Bill, we have been carried back to the first session of the present Parliament, when in the Merthyr Tydfil and the East Hull Gas Bills what are known as suspensory clauses were inserted; but they came to naught. Both the Companies still exist. In the one case—Merthyr Tydfil—the ratepayers as good as told the Local Authority to look properly after the affairs they had in hand, and to leave well alone. In the other case—the East Hull—the Purchase Bill promoted by the Corporation as a result of the suspensory clause was rejected by a House of Lords Committee. A suspensory clause is not the same thing as a purchase clause. In the event of the latter being inserted in a Bill, the company concerned cannot, on the local authority's Bill being promoted, oppose the purchase *per se*, but can only appear for protective purposes in respect of their interests relating to the purchase and transfer. In the case of a suspensory clause being inserted, the powers of the company's new Act are only suspended for a period—long enough for the local authority to promote and prosecute a Purchase Bill in the next session; and, in this event, the company can oppose precisely in the same way as when a compulsory purchase Bill is promoted without any preliminary in the nature of a suspensory clause. The local authority have to prove, on promoting their own Bill, that it will be to the public advantage for them to be put in possession of the works. The Heckmondwike and Liversedge Gas Company have had a suspensory clause put upon them in coming to Parliament for capital, for the consolidation of the existing capital and the application of the sliding-scale, for the purchase of the mains of the Mirfield Gas Company in a small area in which the two Companies have competitive powers, and for certain modern powers. It was a threadbare case the District Councils had to present against the Company; and if it reflects the best they can do, they will find some difficulty in convincing Parliament, if the ratepayers allow them to promote a Bill next session, that their districts would benefit by the transfer of the Company's undertaking to them. Perhaps the ratepayers will not see fit to permit them to waste money in any such quixotic attempt. The evidence that was heard before Lord Kintore's Committee, the fact that their Lordships gave the Company the powers they asked for, and the further fact that the Local Authorities, when they promoted a Bill for compulsory purchase eight sessions ago, were sent about their business without the fulfilment of their desire, all suggest that the ratepayers will be well advised to direct them to set their own houses in order, and not to take upon themselves further responsibilities. Parliament has not yet given compulsory powers in the case of a statutory gas undertaking, unless the local authority can substantiate charges of neglect, mismanagement, and violation of trust and privileges against the gas suppliers.

The Position. But what is the position in this case? When the Purchase Bill was introduced in 1901, the local authority made complaint of the Company that they had spent out of revenue money that ought to have been charged to capital; and that in both manufacture and distribution, there was not economical management. The position in 1909 is altogether different. The Company show a large advance in economical working, and in meeting the requirements of the consumers, and in financial stability. It is a poverty-stricken case that has to rely upon history buried deep below some years of unblemished character. The whole of the ancient points on which the Local Authorities depend for depreciating the character of the Company have been paraded before Parliament on a previous occasion, and then were of no avail, so what hope would there be of carrying a Purchase Bill now? The consumers and ratepayers will not forget that the money spent out of revenue for capital purposes in a long past, and the consequent paying of dividend in years gone by short of the maximum, are to-day benefiting them and the district generally in a cheap gas service. With discounts, the price of gas to-day to private consumers is 2s. 6d., and to the public lamps 2s. 4d. The only suggestion the Local Authorities can make as to why they should be given purchase rights is that the Company have exhausted their powers, and so, to use a parliamentary commonplace, are at the end of their tether. The Heckmondwike District Council have not shown themselves to be masters of the art of efficient local government, as a scathing report by the Local Government Board last September shows. This report does not give assurance that the district would be better served with gas under their administration than it is by the Gas Company to-day—indeed, according to Mr. Honoratus Lloyd, K.C., the Council in their trading in electricity have spent no less than £40,000 on the undertaking, against an authorized £20,000. These matters will be further inquired into, if the Council have the temerity to come to Westminster with a Purchase Bill next session. They will have to prove bad administration on the part of the Company, and that their own administration is such that they are worthy the confidence of Parliament. But for the ratepayers' consideration, there is the further point that, supposing Parliament did place the gas undertaking in the hands of the local authorities, there would then be municipal monopoly in both gas and electricity, instead of the advantages of present open competition between the two. Touching other matters, the power gas clauses still stand in the Bill, though the Unopposed Bills Committee of the Commons saw fit to cut them out of the Leyland and Faringdon Gas Bill the other week. This was a mistake, as was argued at the time (*ante*, p. 769). It is also seen that the Mirfield Company are to be paid £2407 for their mains, &c., in the district in which the two Companies have competitive powers. Mr. E. Herbert Stevenson, for the promoters, approved of this purchase, as it was a mistake to have two Companies in the same area. Thoughts revert to the Draycott and Long Eaton contest of last session, and to the case presented on behalf of the Long Eaton Company. In addition to Mr. Stevenson, Mr. J. Stead, the Chairman of the Company, and Mr. F. D. Richmond, the Manager, gave evidence in support of the Bill. One word more. The Company badly want additional gas storage; and they are to be allowed to proceed with the construction of a holder—the suspensory clause being framed on the lines of the Merthyr Tydfil one in 1906. The full report of the proceedings is held over till next week.

Unprofitable Slots and Stand-by Supplies. It is necessary, subject to action being diplomatic and reasonable, for gas managers in these times to look after financial leakages as well as gas leakages. But powers must always be used with discretion, as otherwise much damage of local reputation may ensue. In considering the Mountain Ash District Council Bill, the Local Legislation Committee, presided over by Sir Francis Leyland-Barratt, took a very practical view of two proposals submitted to them that vary precedent; but legislation is meant to be varied to meet the requirements of the times, though occasionally the parliamentary authorities and the Government Departments show a disposition to ultra-conservatism, and to failure to see that new conditions and new experiences justify legislative changes. Several unsuccessful attempts have been made to obtain authority to make unprofitable users of prepayment meters at least pay sufficient to meet the capital and other charges involved in giving them a supply. In the Padiham and Mexborough and Swinton Gas Bills last year, an endeavour was made to obtain the right to levy an additional charge when the consumption of gas did not give, through the excess price, a 10 per cent. return on the capital outlay. In the Bury, Heywood, and Mountain Ash Bills as introduced this session, the prepayment meter clause contains a proviso to the same effect. As will be seen from our "Parliamentary Intelligence," an interesting discussion took place before the Local Legislation Committee on the Mountain Ash Bill, with the result that the Committee have allowed the proviso. It only alters the clause so far as it relates to a meter without fittings; and then the excess charge is to be 8d., with the right to the Council (if this does not provide an amount equal to 10 per cent. on the cost of the meter) to make, if they think fit, a minimum charge not exceeding the 10 per cent. For the first time in the case of gas, the Committee have allowed a stand-by clause, providing for the payment of an agreed minimum charge where a supply of gas is provided merely as a protecting stand-by, and disentitling a consumer to such a supply if he refuses to agree to a minimum charge. If a stand-by supply is of value to a consumer, it follows that he should pay something for the convenience. This matter, however, is considered in our editorial columns. The Gas Engineer to the Council (Mr. W. G. Thomas) took part in the discussion of the clauses before the Committee.

Bath's Misfortune. Misfortune has pursued the Bath Corporation Electricity Department. It has not been a success under municipal management; and, now when there has been a chance of parting with the undertaking to the

Somerset and District Electric Power Company, at every turn something happens to prevent the scheme being consummated. The Board of Trade refused to be parties to the transfer; and therefore the Power Company promoted a Bill to obtain the sanction of Parliament to the sale and purchase. But the Power Company were late with their notices for the Bill; and the Standing Orders Committee of the Lords have declined to dispense with compliance with the Standing Orders in respect of the dates of the publication of the notices.

Water Bills. There are notes in hand on three or four Water Bills that have been before Committees; but we must postpone reference to them.

ASSOCIATION OF ENGINEERS IN CHARGE.

Annual Dinner.

The Annual Dinner of the Association took place on Saturday, in the King's Hall at the Holborn Restaurant, when a party of over three hundred sat down under the chairmanship of Mr. James Swinburne, F.R.S., M.Inst.C.E., the President; the Vice-Chairman being Mr. Arthur Davey. During dinner an excellent musical programme was rendered; and the subsequent toast list was interspersed with songs.

After the Loyal Toasts had been duly honoured, Sir William H. White, K.C.B., LL.D., F.R.S., proposed "The Association," which he said was doing better work now than at any time in its history. The members were in charge of great interests; and he was confident that belonging to the Association would help them to fulfil their duties more efficiently than they otherwise would do. Engineering was a profession that one might be proud to belong to. How much it did for the human race, it was impossible to understand. He coupled with the toast the name of Captain H. Riall Sankey, M.Inst.C.E., who returned thanks. Mr. Davey proposed "Our President;" and Mr. Swinburne, in reply, said he could not help feeling that engineers did not perhaps sometimes take themselves quite seriously enough. England was now one huge workshop; but the country was by no means governed by engineers, or even governed in any kind of way that would appeal to engineers at all. Let them imagine what a limited liability company would be, if it were governed on the party system. Dr. R. T. Glazebrook next submitted "Our Guests and Friends," and remarked that, though he could not speak as an engineer-in-charge, he did speak as one who appreciated very highly the work that they did. It was utterly impossible to over-estimate their indebtedness to engineers and the engineering profession. With the toast was coupled the name of Mr. A. J. Walter, K.C., who, in acknowledgment, said his heart always had been, and always would be, in the workshop rather than in the Courts. The secret of the work of engineers was that their heart was usually in what they did. He knew no body of Englishmen of whom it could be said that their whole life was so wrapped up in their work as was the case with the engineering profession. Mr. A. E. Penn proposed "The Kindred Institutions;" remarking that, if it had not been for the other Institutions and the kindly help they had extended, he did not know what the position of their own Association would have been. But, much as they owed to the Institutions as a whole, he felt that they owed considerably more to individual members of them who had come forward and given the Association their time, and had lent their names, and contributed in every other possible way to its success. Not the least among these was the gentleman whose name he had the honour of associating with the toast—Mr. H. Percy Boulnois, M.Inst.C.E., who had been an ardent supporter of the Association for many years. Mr. Boulnois' reply, in which he wished the Association prosperity, brought the toast list to a close.

Garcke's "Manual of Electrical Undertakings."—We have received from the Electrical Press, Limited, of 37 and 38 Strand, the above-named "Manual" for the current year, which appears in an enlarged form. It contains the latest statistics and other information regarding every electrical undertaking under municipal or joint-stock control, and includes the names of more than 11,000 Directors, Engineers, and officials engaged in the industry. The names and addresses of members of Lighting and Tramway Committees are more than doubled; and the Colonial section is greatly amplified. To the usual tables several new ones have been added. The book contains upwards of 2000 pages; and its price is 21s. net.

Price Lists of Gas Appliances.—Reference has been made from time to time in the "JOURNAL" to the Compagnie pour l'Eclairage des Villes et la Fabrication des Compteurs et Appareils Divers of Paris. The Company have a capital of 7,000,000 frs. (£280,000), and own 36 gas-works in France. They are naturally desirous of extending the consumption of gas in their different districts, and, with this object in view, are in search of all appliances, whether or not of a novel character, for lighting, heating, and other domestic and industrial purposes, to offer to their customers. At their request we make this fact known through our columns, in order that English makers of these appliances may have an opportunity of assisting the Company by sending them their price lists and any other particulars which are likely to be useful. The address is 106 and 108, Rue de Lourmel, Paris.

TESTIMONIALS OF LONG AGO.

A Few Interesting Disclosures.

IN our "Electric Supply Memoranda," reference is made to certain testimonials that the "Electrical Review" published from electricity users—some of whom were at the time of writing very much prejudiced by personal interest, some are now dead, and some have long since ceased to occupy the premises to which the testimonials allude. The letters were, of course, all in favour of electricity. Our journalistic friends gravely remarked: "We make our first selection from a large number," &c. They may be strongly advised not to make a second selection, without instituting a very critical inquiry into them. The testimonials were mostly dated 1902. Here are samples:

> We have made use of electric energy for lighting our place from the earliest moment possible.
> The installation replaced gas with incandescent burners, and was also used in places where gas had been found unsuitable, and our experience shows that 20 per cent. more light can be obtained for the same money by using electric energy in place of gas. GEO. DURRANT AND SON.
> *Hertford, Aug.* 8, 1902.

> I am delighted with my electric light bill; it is less than half my gas account for the corresponding quarter of last year. G. W. FITTON, M.P.S.
> 49, *Fore Street, Hertford, Jan.* 27, 1902.

> It is cheaper than gas. JOSEPH WREN.
> *Crown Bakery, Hertford, April* 4, 1902.

> I am quite satisfied with the light, which I find cheaper than incandescent gas lighting. CHARLES MASSEE.
> "*The Ram*," *Fore Street, Hertford, Sept.* 1, 1902.

These testimonials from Hertford are interesting; and we hope our contemporary will not take amiss a few comments it is desired to make on them. Messrs. George Durrant and Son, the writers of the first testimonial, are chemists. Before installing electricity, they used flat-flame burners; and a little gas is still consumed in the place. Mr. George Durrant is now dead; and "although experience" according to the ancient manuscript, "shows that 20 per cent. more light can be obtained for the same money by using electric energy in place of gas," the representative of the firm to-day—six or seven years after the date of the testimonial—does the local gas undertaking the honour of patronizing it entirely for the purposes of his private house. Mr. Fitton—who, in 1902, was delighted with his electric light bill, and found it less than half his gas account for the corresponding quarter of the previous year—apparently overlooked such trivial details as that he only had electricity partially installed; and, in addition to his ordinary gas supply for lighting and cooking, he also had a small gas-engine in use! No wonder his electric light bill was only half his gas bill! Mr. Fitton has now left Hertford! It is an old trick of the electricians to omit to state the conditions with which they make comparison. Then Mr. Josiah Wren (not Joseph) made the dogmatic assertion in 1902: "It [meaning electricity] is cheaper than gas." Mr. Wren is a local celebrity; but that does not debar him from going to the gas officials and having his mistake proved, if he so desires. Mr. Massee was quite satisfied with the electric light in 1902, which he found cheaper than gas. Alas! Mr. Massee left Hertford some years ago. "The Ram" *is now lighted by gas! Tempora mutantur, et nos mutamur in illis.*

There are two testimonials from Lewes:

> As one of the first consumers of the electric light in Lewes, I am very well pleased with the result.
> I had formerly 25 gas-burners in my house, of which eleven were incandescent. These were replaced by 45 16-candle power lamps; and I find that the cost for the year is less than 3¾d. per unit. Taking seven units as equivalent to 1000 feet of gas, the price works out at 2s. 2½d. for electricity, as against 3s. 10d. for gas. Apart from this the cost of renewals and lamps, &c., is much less. G. HOLMAN, ex-Mayor.
> "*The Rowans*," *Lewes, Aug.* 22, 1902.

> I have not the slightest hesitation in saying that it has been cheaper to use than gas was. WILLIAM GATES, Mayor.
> *Lewes, Aug.* 29, 1902.

The first testimonial is of interest, in that Mr. Holman is still a user of electric light, and one of its staunchest supporters in the town. But it will be observed that out of 25 gas-burners he had in use, no less than fourteen were of the old wasteful flat-flame type. He put in 45 16-candle power lights, equivalent to a total of 720-candle power. Supposing his 25 gas-burners had been all incandescents, each consuming less than a flat-flame burner, and giving 60-candle power (of course, he could have 20-candle power ones if he liked), he could have had 1500-candle power distributed about his house. He takes 7 units of electricity as equivalent to 1000 cubic feet of gas. With metallic filament lamps, a unit of electricity consumed in an hour will give 800 candles; and therefore 7 units would give 5600 candles. The 1000 cubic feet of gas at (according to the burner used) 16 to 20 candles per cubic foot would give 16,000 to 20,000 candles. Mr. Holman's testimonial does not appeal to us; and we should like to hear him in defence of his figures. Nevertheless, this gentleman is still a fair patron of gas, and uses it for cooking purposes.

Regarding the testimonial by Mr. Gates, it is not stated how he

formerly used gas. He is not now a consumer of gas or electricity, having been dead three or four years. Up to the time of his death, he was a good consumer of gas for cooking and heating. For the latter, fires were installed after the electric light was put in; and his consumption in certain quarters was more than when he used gas alone for lighting. R.I.P.

We take next a group of testimonials from Sutton, Surrey. Here they are:

> I am very pleased with the light, both as regards quality and steadiness; and the price compares favourably with the corresponding last year's gas account.
>
> MARLBOROUGH CONRATH.
>
> *Eaton House, Sutton, Surrey, Oct.* 11, 1902.

> My accounts come out surprisingly low; and at the rate you are charging, I do not see how gas can possibly compete with it.
>
> H. W. HANDCOCK.
>
> 5, *Albion Road, Sutton, Surrey, Oct.* 11, 1902.

> I am agreeably surprised at the amount of the first quarter's account for electric light and power; the former compares very favourably with the amount I paid for gas during the corresponding quarter.
>
> FRANK BEER.
>
> "*Bermount*," *Sutton, Surrey, Oct.* 25, 1902.

> By far the best and most economical form of illuminant.
>
> THOS. A. PETTIVER.
>
> *Municipal Offices, Sutton, Surrey, Sept.* 25, 1902.

The form of gas-burners previously used in the houses of the writers of these Sutton testimonials is not stated. But Marlborough Conrath left the town some twelve or eighteen months ago. Mr. Handcock has left Sutton; and the house is empty. Frank Beer is not in the Sutton gas-supply district; and the composer of the last testimonial, as Clerk to the Council, and writing from the municipal offices, voices an opinion favourable to electricity, but he generously spreads his favours by patronizing gas at his own residence. He is a large-hearted gentleman. With gas at 2s. 8d. per 1000 cubic feet at Sutton, it is easy to prove that it is impossible for the Electric Light Company to supply their illuminant, light for light, at anything like the price charged by the Gas Company.

From Weston-super-Mare, there is a testimonial, which reads:

> Our electric light has cost us equal to about 2s. 6d. per 1000 cubic feet of gas; and gas in Weston is 3s. 2d. per 1000 (subject to a discount, according to quantity consumed).
>
> NORMAN AND SON.
>
> 18, *Regent Street, Weston-super-Mare, Oct.* 6, 1902.

We must in the first place point out that gas in Weston-super-Mare was reduced to 3s. in September, 1904, subject to discounts ranging from 2½ to 15 per cent., according to quantity used. It would be instructive to learn from Messrs. Norman and Son, the basis on which they asserted that the electric light cost them equal to about 2s. 6d. per 1000 cubic feet. Mr. Norman, sen., is Chairman of the Lighting Committee of the Council; but notwithstanding the Gas Company obtained a contract for the entire lighting of Weston-super-Mare for three years from June, 1908! The firm have electric light in their shop in Regent Street; but it will interest the "Electrical Review" to know that Messrs. Norman have also been increasing users of gas. In the year ending December, 1902, they paid for gas for the purposes of the shop £2 10s. 5d.; the consumption has been gradually increasing, until last year the firm paid £4 13s. 5d., though the price of gas was reduced to 3s. in 1904. They do not increase their patronage for the pure fun of the thing. Gas is still used at the private residences of Messrs. Norman; but—to be strictly fair—this may be due to the fact that electric cables are not in the roads.

Our friends of the "Electrical Review" may be left to judge of the value of the testimonials to which they devoted space; and they are just as much at liberty to test the truth of the disclosures made here as we have been to ascertain the value of the testimonials. However, they are to be thanked for the amusement afforded by their recent efforts at proving that electricity is cheaper than gas.

Numerical and Financial Position of Trade Unions.

The report of the Registrar of Friendly Societies recently issued, giving results for the year 1907, shows that no less a sum than £6,424,176 is possessed by the 652 Trade Unions whose figures are included. The total membership amounts to 1,973,560, while the annual income for 1907 was £2,936,095. Comparing 1907 with 1906, it is noticed that the membership has increased by 12·9 per cent., the income by 7·7 per cent., and the funds by 8·7 per cent. The figures for 1907 show that the funds average £3 5s. 1d. per member; but the amount of funds possessed by individual Trade Unions varies enormously. For example, in the case of the Amalgamated Cotton Spinners, with a membership of 22,506 and funds totalling to £554,345, the amount per member is £24 12s.; whereas in that of the Gas Workers and General Labourers it is only 3s.—the number of members being 39,805 and the total funds £6794. As would be expected, however, in a Trade Union whose members are largely employed in an industry which has done so much for labour in the direction of profit-sharing or co-partnership, there are no signs of active strength in the latter figures. The money, instead of being held by the Trade Union, is invested in the gas company which provides the employment—at least, that is at present the tendency.

THE PRODUCTION OF WATER GAS IN VERTICAL COAL-GAS RETORTS.

THE following is an abstract translation of an article in a recent number of the "Journal für Gasbeleuchtung," by Herr R. Terhaerst and Dr. Trautwein, the Manager and Chemist respectively of the Nuremberg Gas-Works, on the much-discussed question of the economy of making a mixed gas in vertical retorts.

The authors refer to the widely divergent opinions which have been promulgated on this question. For instance, Herr Kobbert, of Königsberg, on the basis of figures published for the working of the installation of Bueb vertical retorts at the Cologne Gas-Works, calculated that the water gas made in such retorts was about 64 per cent. dearer than water gas produced in an independent generator (see "JOURNAL," Vol. CIII., p. 441). On the other hand, Herr Körting and Dr. Geipert (see "JOURNAL," Vol. CIV., p. 404) argued that considerable economical advantages ensued from the admission of steam into vertical retorts. They took up the position that the heat required for producing water gas in these retorts was entirely derived from the sensible heat of the coke remaining in them after the carbonization process had completed itself, and that, consequently, there was no special expenditure of fuel for providing the heat required for the production of water gas. The practical basis for this assumption was afforded by the results of the trials made at the Mariendorf Gas-Works by the staff of the Carlsruhe Instructional and Experimental Gas-Works of the German Association (see "JOURNAL," Vol. CII., p. 813). These results showed that, when steam was not admitted to the retorts, the fuel consumed in the furnaces amounted to 14·5 per cent. of the weight of coal carbonized; while when steam was admitted, the corresponding fuel consumption was only 14·1 per cent. [It may here be pointed out that in an article in which the contentions of Herr Körting and Dr. Geipert were criticized in the "JOURNAL" (Vol. CIV., p. 400), this curious discrepancy in the results obtained in the Mariendorf trials was commented upon, much in the sense in which Herr Terhaerst and Dr. Trautwein now proceed to discuss it.]

The authors considered that, having regard to the wide divergence of opinions shown by these and other communications, it would be advantageous to discuss the data on which they are based, especially as it appears, they say, questionable whether the conclusions arrived at in the trials made under the auspices of the Instructional and Experimental Gas-Works are applicable generally. It will be seen by comparing the fuel consumption found at Mariendorf with that reported elsewhere for vertical retorts, that it was relatively low at Mariendorf when steam was admitted to the retorts. For instance, the Cologne results (see "JOURNAL," Vol. CII., p. 562) and those obtained by the Instructional and Experimental Works in the trials made at Zürich (see "JOURNAL," Vol. CIV., pp. 256-7) do not agree with the figures obtained at Mariendorf. The fuel consumption at Cologne when steam was not admitted was 15·6 per cent., as against 17·23 per cent. when steam was admitted; while at Zürich it was 13·9 per cent. without steam and 15 per cent. with steam. These ratios are the reverse of those obtained at Mariendorf. Moreover, it is highly improbable that, with admission of steam, relatively less heat is required than when steam is not admitted. This may be illustrated by a simple practical example.

When steam is not admitted, the charge is worked off in 10½ hours; when steam is admitted, in 12 hours, in the last 1½ hours only of which the steam is introduced into the retorts. On the assumption that the conditions of the weight of charge, the quality of the coal, the temperature of the setting, &c., are the same, there should be exactly the same expenditure of heat required for carbonization during 10½ hours by both methods of working. It cannot, however, be held that the succeeding 1½ hours, during which water gas is made when steam is admitted, can be covered by the sensible heat of the coke in the retort alone without the temperature of the setting falling. There is not only the heat required for the water-gas process, but also the expenditure of heat for the indefinite, but considerable, losses by radiation and conduction during the time. As a fact, the setting is fired also during the time of water-gas production. Consequently, the expenditure of fuel when steam is admitted must be relatively greater than when steam is not used. Thus, if the opposite were the case in the Mariendorf trials, it follows that in carrying them out there must have been some sort of difference in the experimental conditions in the two methods of working—perhaps in the quality of the coal carbonized, or the coke used, or possibly in the proportion of carbonic acid in the chimney gases. Probably an explanation could be found on reference to experimental data which have not been published. In a comparison of the two methods of working, the authors consider that the heat imparted to the retort during the time of water-gas production must be added; and this expenditure of heat must be proportionately at least as high as for the same period without admission of steam. Undoubtedly the consumption of fuel in the retort-furnaces during this period must be reckoned against the water gas manufacture.

An important fact to be observed in connection with the production of mixed gas is that both the time expended and the make are increased by about 10 to 12 per cent.—such increase being necessarily limited. On the other hand, while water gas is

being made the retorts are not available for the production of coal gas. The economy of mixed gas production must therefore depend on the possibility of a comparatively high addition of water gas. Obviously such conditions are much less favourable for the retorts, as it is clear that a greater number of retorts are required to produce mixed gas than to produce the same quantity of coal gas. The increased working charges resulting therefrom, as well as the charges for the depreciation of the settings, for repairs, service, heating, &c., which are entailed by this peculiar method of water-gas production must likewise be charged against this method of working. In regard to the consumption of carbon for water-gas production in the retorts, the authors take the view that the portion represented by scurf must be taken into the calculation, as this portion would otherwise be sold, while the loss by scurfing, which, according to Herr Prenger, of Cologne, amounts to only 3 per cent. of the total amount of scurf, is practically of no consequence. The production of 0·29 lb. of scurf per 100 lbs. of coal carbonized, quoted for the vertical retorts, is extremely high, and clearly must be traced to the very high heats. At the Nuremberg Gas-Works, the scurf made only amounts to about a quarter of this proportion.

The following calculation will show more clearly the relations between the two methods of working. The method of calculation followed is that adopted by Herr Korting and Dr. Geipert; but certain figures on the cost of water-gas production which do not tally with the authors' experience at Nuremberg have here been altered. Assuming that 80,000 cubic metres (about 2,825,000 cubic feet) of mixed gas have to be produced per 24 hours, water-gas plant for a capacity of about 530,000 cubic feet per diem would be required; and the cost of this may be put at £4250. The repairs on this, based on the average of the last three years, would amount to £75 per annum. According to Herr Körting, the cost of a vertical retort setting amounts to £2500, and the repairing charges to £150 per annum. The cost of water gas in the water-gas plant would be as follows:—

	Per 1000 Cubic Feet.
Coke, 36·7 lbs. at £1 0s. 4d. per ton	4·0d.
Wages	0·3
Total	4·3d.

The cost of the water gas made in the vertical retorts is as follows:—

	Per 1000 Cubic Feet.
13 lbs. of carbon = 14½ lbs. of coke at £1 0s. 4d. per ton	1·6d.
2·8 lbs. of carbon = 2·8 lbs. of scurf at £2 10s. 10d. per ton	0·7
Total	2·3d.

For the daily make of 2,285,000 cubic feet referred to, there would be required, if the vertical retorts were worked without admission of steam and the carbonizing period extended to 10½ hours, fourteen settings of vertical retorts in action for 24 hours, producing 2,350,000 cubic feet of coal gas, to which must be added water gas amounting to 475,000 cubic feet to make up the total quantity of mixed gas containing about 17 per cent. of water gas. On the other hand, if steam were introduced into the retorts and the charges remained in the latter for twelve hours, then, according to the result of the Mariendorf trials, the make of gas per ton of coal carbonized would be increased from 10,620 to 12,880 cubic feet. With charges of the same weight, the output would therefore be as follows:—

From 14 settings in 21 hours, 2,066,000 cubic feet of coal gas
" 14 " " 24 " 2,493,000 " " " mixed gas
" 15·9 " " 24 " 2,825,000 " " " " "

If the plant were kept in action for 300 days in the year, there would be produced in both cases about 140 million cubic feet of water gas, of which the cost would be as follows:—

In Water-Gas Generators.

Interest and depreciation charges on £4250 capital expenditure at 6 per cent.	£255
Repairs	75
Manufacturing charges for 140 million cubic feet of water gas at 4·3d. per 1000 cubic feet	2508
Total	£2838

In Vertical Retorts with Steam.

Interest and depreciation charges on a capital expenditure of £2500 × 1·9 = £4750 at 6 per cent.	£285
Repairs for 1·9 settings	285
Wages	95
Manufacturing charges for 140 million cubic feet of water gas at 2·3d. per 1000 cubic feet	1341
Fuel consumption for 1·9 settings	1159
Total	£3165

The fuel consumption has been taken at the same figure as for working without admission of steam—viz., 14·5 per cent. by weight of the coal carbonized, which is comparatively favourable. The make of mixed gas in 300 days would amount to 2,825,000 × 300 = 847,500,000 cubic feet, for which, when steam is introduced, 15·9 settings are required. Hence the make per setting amounts to 53,320,000 cubic feet; so that the expenditure on fuel per setting for 300 days amounts to about $\frac{53,320,000}{12,880} \times \frac{14·5}{100} = 600$ tons of coke or, for 1·9 settings = 1140 tons of coke, of which the value would be £1159, which is the figure taken above.

From these figures, it follows that, as Herr Kobbert pointed out, the conditions for producing water gas in the retorts are in no way more favourable from the economical standpoint than the conditions for producing similar mixed gas without the admission of steam into the retorts. In the case considered, the proportion of water gas in the mixed gas is relatively small, amounting only to about 17 per cent. This is the highest proportion practically attainable in the production of mixed gas in vertical retorts. If it is desired to increase the proportion of water gas, an independent water-gas generator has to be resorted to. It therefore remains to be established whether such a method of divided mixed gas production would be advantageous. In any case it cannot be pleaded in its favour that it simplifies the working. An increase in the proportion of water gas in this manner is, however, limited by the calorific value of the mixed gas produced in the retorts. It will be seen from the Mariendorf trials that, when the charges are worked off in twelve hours with the admission of steam, the limit set for the standard quality of gas is reached. Any further addition of water gas would not therefore be permissible; and an increase of the make could only be secured by bringing further settings into action. For flexibility of working this fact is important, as in case of need a water-gas generator will produce gas in less than two hours; while a retort-setting requires at least three days. Attention was drawn at the general meeting of the Association in Berlin to the special method of working followed at the Nuremberg Gas-Works for the production of mixed gas.

The carbonization is carried on in inclined retorts at moderate heats with as low a consumption of fuel as possible. The dissociation of the high molecular constituents of the gas is thus avoided to the greatest extent, and a rich coal gas of high calorific power is produced, while, at the same time, there is a large yield of bye-products. In the next stage, this gas is mixed with uncarburetted water gas, and thus brought down to the desired calorific power. According to the results so far attained in this manner, a mixed gas having a net calorific value of about 4600 calories per cubic metre (489 B.Th.U. per cubic foot), such as was obtained in the Mariendorf trials, would be obtained at the Nuremberg Gas-Works at a yield of at least 14,636 cubic feet at 60° Fahr. and 30 inches pressure per ton of coal carbonized. This figure is thus very considerably higher than that for the yield in vertical retorts when steam is admitted. Referring to the foregoing calculation, there could be obtained by the carbonization of the same quantity of coal, without the admission of any steam to the retorts, in place of 2,825,000 cubic feet of gas, as much as 3,350,000 cubic feet per diem having the same calorific value. In order to obtain the same result with vertical retorts with the admission of steam, 18·9 settings would be required in place of 14 settings without the admission of steam.

The foregoing considerations show that independent water-gas production is more economical than its production in vertical retorts; while it is specially interesting to note that for the same calorific power of the gas a higher yield of mixed gas per ton of coal is obtained by the method of working with inclined retorts as followed at Nuremberg than by the use of vertical retorts with the admission of steam. It may, however, be argued that in these cases a different coal has been used and, consequently, a fair comparison is not quite possible. On this account the figures obtained in the trials made by the Instructional and Experimental Works of the Association at Zürich are applicable, as they were with Saar coal, such as is carbonized at Nuremberg.

	Mixed Gas per Ton of Coal at 60° Fahr. and 30 Inches, Cubic Feet.	Calorific Value B.Th.U. per Cubic Foot at 60° Fahr. and 30 Inches.	B.Th.U. per Ton of Coal.
Zürich	13,612	508·3	6,919,234
Nuremberg	13,666	507·7	6,918,025

It will be seen from these figures that the B.Th.U. per ton of coal are nearly the same in both cases; and it may therefore be concluded that, actually, the results are not very widely different. It is interesting, further, to compare the yield of bye-products in the two cases:—

	Dry Coke, Per Cent.	Ammonia, Per Cent.	Tar, Per Cent.
Zürich	67	0·203	5·5
Nuremberg	67	0·209	5–6

These yields are practically identical, and the tar produced at the Nuremberg works is likewise freely fluid, and of a valuable high quality. It will be realized, therefore, that, in comparison with the working of vertical retorts, the mode of working followed at Nuremberg affords good results, though inclined retorts are used. Moreover, with the moderate heats employed at Nuremberg, the life of the settings must be more prolonged than that of the vertical retorts, to the lower parts of which very high heats must be applied. The admission of steam to vertical retorts must tend to facilitate the discharge of the coke, which otherwise may be troublesome if it is not very thoroughly carbonized; but for the rest it seems disadvantageous rather than advantageous. The vertical retorts, when steam is admitted, must be liable to irregular pressures, causing greater difficulty in working; and for this and other reasons they require the attendance of a specially trained staff. Their manipulation must therefore be considered more complicated.

When a mixed gas is supplied, it is specially important that it

should be of uniform quality at all hours of the day and night. At Nuremberg, fluctuations of as much as 5 per cent. in the calorific power of the gas supplied are unknown. The water gas is passed continuously into the works' coal-gas main, and further mixing takes place in the gasholders. This plan has been followed now for some years past, and has not given rise to any trouble. There seems no question, to the authors' minds, that the manufacture of water gas in an independent generating plant is, apart from the advantages already indicated, preferable on account of its much greater flexibility and readiness for working to the production of water gas in retorts.

FIGURES OF COKE SALES.

[COMMUNICATED.]

YOUR editorial remarks, on the home markets for coke, in the "JOURNAL" for March 2, are very much to the point, and put the question with regard to "coke figures" in a nutshell.

As you say, "data on which coke calculations are made are grossly inconclusive and delusive." If these figures are to be of any use, there should at least be uniformity in the method of stating the quantities of coke and breeze available for sale. In his letter, on the make and sale of coke, in the "JOURNAL" for March 9, Mr. H. Kendrick, of Stretford, doubts the possibility of selling coke to the amount of 13 cwt. per ton of coal; and most people would join issue with him on this point. But there is no doubt that a quantity of about 12 cwt., or a little over, can be fairly justified.

It must be remembered that these figures include coke and breeze. By "breeze" is undoubtedly meant "coke breeze" and "pan breeze," though Mr. Watson in his paper on the subject—in stating that a sale of anything more than 10¾ cwt. of coke and breeze can scarcely be hoped for—adds that this quantity does not include "pan breeze." His further statements also plainly show he assumes that in cases where large quantities of coke and breeze are used for various works' purposes other than retort-furnaces, the amounts are not included in the figures relating to the coke and breeze available for sale. The writer, however, contends that in some cases not only is boiler-fuel included under this heading, but also coke and breeze used for other purposes—such as main-laying, locomotive and steam-crane boilers, works' fires, and blacksmiths' forges; and, further, the quantity undoubtedly does include "pan breeze." To the writer, there would appear to be no good reason why "pan breeze" should be omitted when the heading distinctly states "coke and breeze."

It is further not clear why both Mr. Watson and Mr. Kendrick should take it for granted that coke and breeze used for works' purposes are not, and should not be, included as coke and breeze available for sale. This amount may certainly be said to be "available for sale," though in this case it would be sold to the various departments of the concern itself as a preferential customer. Otherwise, the figure would be more misleading than ever; though if there are many who include the quantities used on the works, and an equal number who do the reverse, it is impossible to imagine a more hopeless state of chaos.

To carry the point further, does Mr. Kendrick include in the amount "available for sale" the quantity used in his water-gas plant at Stretford? Most gas engineers would no doubt be glad to have this matter settled once and for all. An official pronouncement by the Institution would be all that is necessary.

To revert to the statement contained in the earlier part of this article, that 12 cwt. of coke and breeze as available for sale can be justified, it will be advisable to deal with this point in detail. Taking 13¼ cwt. as the average production of coke and breeze per ton of coal—and this is the figure given by Mr. Kendrick as the average from some hundreds of samples; assuming that the fuel used in the furnaces amounts to 20 per cent.; deducting this proportion from 13¼ cwt.; and there will be left 10·60 cwt. of coke and breeze before being quenched, leaving 1·40 cwt. to be added by water. This would be distributed in about the following proportions:—

			Net Amount on Dry Basis.
9·70 cwt.	of coke containing	9·28 per cent. of moisture	8·80 cwt.
1·20 ,,	coke breeze ,,	16·6 ,, ,,	1·00 ,,
1·10 ,,	pan breeze ,,	23·8 ,, ,,	0·80 ,,
12·00 cwt.			10·60 cwt.

With a better fuel return, giving a quantity of (say) 15 per cent. used in the furnaces, and a lower percentage of water, the corresponding figures might well be expected to approximate to the following:—

			Net Amount on Dry Basis.
10·20 cwt.	of coke containing	5 per cent. of moisture	9·69 cwt.
1·00 ,,	coke breeze ,,	10 ,, ,,	0·90 ,,
0·80 ,,	pan breeze ,,	15 ,, ,,	0·68 ,,
12·00 cwt.			11·27 cwt.

There would be nothing exceptional in such figures. In the first, the percentage of water might be considered rather high; but in the second the quantity would be considered very low. Coke breeze will, on an average, contain about 16·6 per cent. of moisture—being of a nature to soak up a large quantity of water. Pan breeze after being saturated in the ash-pan will contain fully 23·8 per cent. of water. To judge the percentage of moisture by appearance is a very difficult matter; and a quantity which might seem to be excessive on paper would not seem so were the sample judged by its appearance only. Coke with 5 per cent. of moisture would appear to be absolutely dry and entirely satisfactory in this respect.

In a letter to the "JOURNAL" in June, 1907, Mr. A. E. Collins, the City Engineer of Norwich, replies to a letter written to the "Manchester Guardian," in which is asked the permissible amount of water in coke, and how large a quantity would constitute a fraudulent excess. Having made inquiries of various gas engineers, he briefly gives their replies, from which it is noticed that two consider a percentage of moisture ranging between 5 per cent. and 11 per cent. would be such as would avoid any complaints; another considers that 11 per cent. would be very high. Two others state that 8 per cent. should be the limit; and yet another that he would not like to be compelled to sell coke with less than an average of 7½ per cent. of moisture. Another person (who is neither a gas nor a coke manufacturer) says the moisture should not exceed 4 per cent. It will be seen that opinions vary considerably; and it is not surprising, for the porosity of coke varies enormously. One piece will be quite light and dry, and another dark-looking and heavy. This fact greatly increases the difficulty of sampling; and it is no easy matter to obtain a proper proportion of the good and bad pieces.

In this question of make and sale of coke, one fact is certain—that there are no practical means of ascertaining the "make." Consequently, it is quite impossible to arrive at "fuel percentages" with any degree of accuracy. The only figure which is of real importance is the sale of coke—not coke and breeze. The more coke we can make for sale, the less we are using in our furnaces, and the more economically are we heating our settings, and (what may be equally important) the more careful are we in handling the fragile bye-product from the time it is removed from the retort until it is safely weighed into barge, truck, or van. And the same reasoning applies to the care with which we clean and clinker the fires, so as to lose into the ash-pan as little as possible of the goodcoke.

Where figures are given dealing with the sale of coke and breeze, it would be infinitely better were they given under two separate headings, or preferably under three—coke, coke breeze, and pan breeze. Those gas undertakings in the South, selling coke, &c., in the neighbourhood of 12 cwt. and 13 cwt. per ton of coal—which are evidently the cause of envy to their brethren in the North—will then show how much of the 12 cwt. or 13 cwt. is "coke" and how much "breeze."

Municipal Boycotting of Gas.

The Engineer of an important Gas Company near London gives particulars of a little episode that will be of interest to his *confrères*. He writes: "Some time ago we received a letter from a large printing firm, entrusted by our County Council with the printing of their tram tickets, stating their terms for receiving advertisements on the backs of such tickets. We accepted their offer to print a number of these tickets with an advertisement for gas fires and stoves. A week or so ago, we received a letter from the printing firm stating that a communication had been sent to them by the Manager of the Tramway Company, instructing them to refuse any further application for an advertisement from us, as such advertisement was detrimental to the interests of the municipal undertakings." Our correspondent adds: "I presume the authorities have a right to decide on the advertisements that they may accept, but, to say the least, their action seems extremely petty."

Evening Star Lodge.

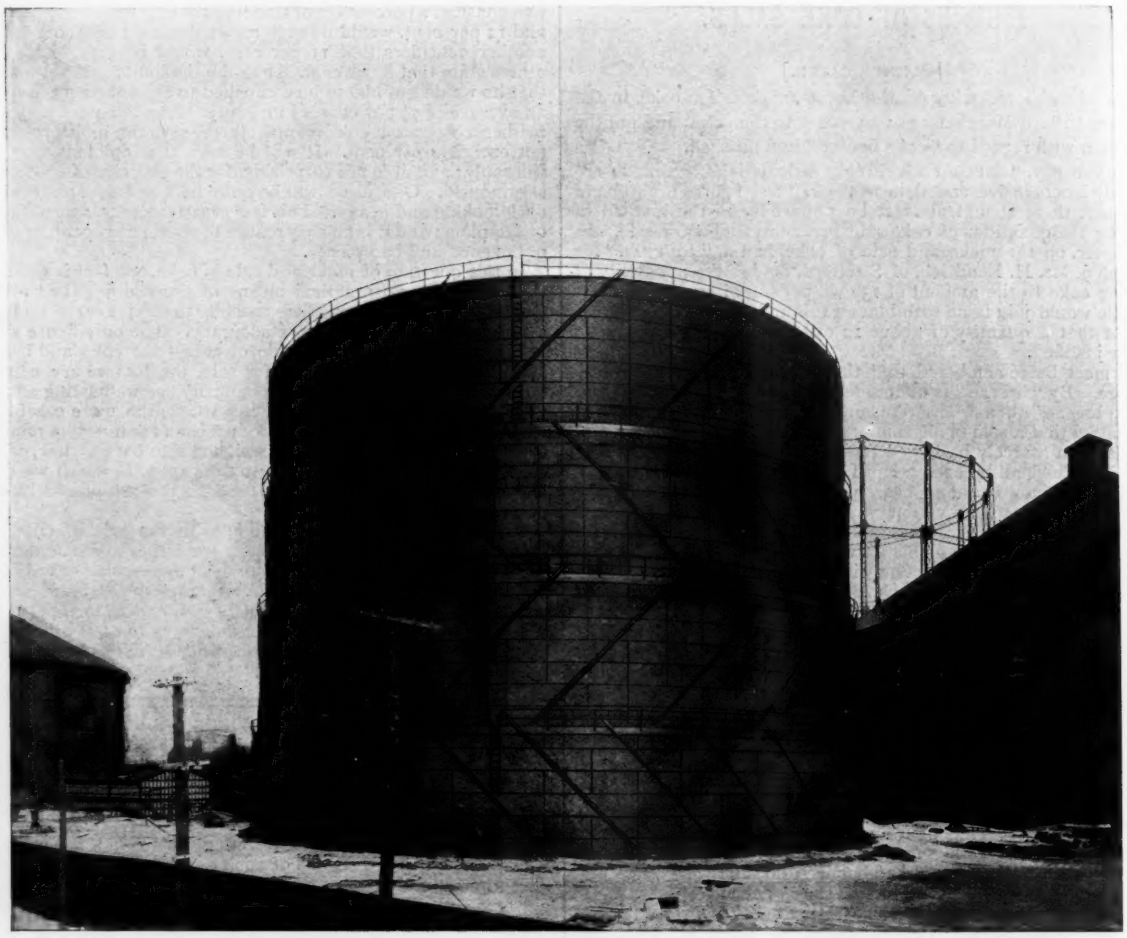
Last Wednesday, the Installation Meeting of the Evening Star Lodge, No. 1719, was held at the Gaiety Restaurant. The chair, at the commencement of the proceedings, was occupied by the W.M., Bro. Glover Clark; and after the ordinary business had been transacted, W. Bro. W. T. Dunn, I.P.M., installed the Master for the ensuing twelve months, Bro. Jacques Abady. The new officers were then appointed as follows: Senior Warden, W. Bro. W. A. Surridge, P.M. Eclectic Lodge, No. 1201; Junior Warden, Bro. Cyril Davis; Treasurer, W. Bro. James Randall, P.M.; Secretary, W. Bro. W. D. Child, P.M., P.P.G.St.B. for Essex; Senior Deacon, Bro. W. Edgar; Junior Deacon, Bro. E. G. Smithard; Inner Guard, W. Bro. A. E. Croager, P.M. Lullingstone Lodge, No. 1837; Director of Ceremonies, W. Bro. Arthur Valon, P.M.; Organist, W. Bro. C. W. Offord, P.M. Enfield Lodge, No. 1237; Stewards, Bros. J. T. Randall and J. F. Wicks. At the subsequent banquet there were present several Past Grand Officers and a number of brethren from the Provinces—including W. Bro. Batt, of Manchester, W.M. of the Northern Star Lodge, and W. Bro. J. H. Troughton, of Newmarket, W.M. of the Etheldreda Lodge.

The Manchester and District Junior Gas Association will hold their annual meeting next Saturday. The business will consist of the election of officers, the presentation of the annual report, the delivery of an address by the President, &c. The meeting will be followed by a smoking concert.

THE FOUR-LIFT SPIRAL-GUIDED GASHOLDER AT MONTREAL.

WITH CLAYTON AND PICKERING'S PATENT SPIRAL GUIDES.

In November last year, Messrs. Clayton, Son, and Co., Limited, of Leeds, completed, at Montreal, a four-lift spiral-guided gasholder. The holder was erected in a tank which had been previously occupied by a two-lift holder, and which was housed-in, in order to protect it against the heavy snows, and exceptional climatic conditions, of Canada. The house was razed to the ground by a terrible explosion, which also entirely destroyed the gasholder it contained. The Company thereupon decided to utilize the tank, and ask for tenders for a four-lift holder, to work in the open, with a capacity of a million cubic feet—the diameter of the existing tank being 123 feet.



In order that the holder might be able to withstand the additional pressure due to the accumulation of snow before it can be cleared off, it was specified that the holder should be capable of bearing a total load of 200 tons of snow, when unsymmetrically disposed; and, in order to meet this contingency, it was necessary that the cups of the holder should be unusually deep.

Spiral guide plates were not adopted, as originally specified by the Gas Company, but a special strong section of Clayton and Pickering's patent guide was specified by the Contractors, so as to meet the heavy strain likely to come upon them by the snow-loads, and which would be perfectly safe under the exceptional climatic conditions of Canada. Their tender, embodying these special guides (claimed to be the strongest ever invented), was at once accepted. The advantage in these guides is that the flange itself connecting to the holder, being much wider than the old type of rail section, is stronger to resist distortion by twisting.

On examination of the spiral guides shown on the photograph, it will be seen that a new departure has been made in placing the spiral guides alternately—one lift forming a right-hand screw, and its neighbour a left-hand screw. Thus two lifts go from left to right, and two lifts from right to left, with the result that a four-lift holder only travels round one-fourth the distance of the old type, when the guide-rails were all placed one way. This makes it far more convenient for the working of the anti-freezers, and also for the ladders.

The four lifts of the Montreal holder are all 24 feet deep by 121 feet, 119 feet, 117 feet, and 115 feet in diameter. The cups are 2 feet deep; and the crown rises to 9 feet.

The holder is the largest spiral-guided holder in Canada, and the largest in the world working under such trying climatic conditions, as the severe frosts, the heavy snowfalls, and the high wind-pressures which prevail in Canada. It has worked perfectly satisfactorily during the past winter, and proved a great success in the spiral guiding of gasholders.

The order was cabled from Montreal on the 24th of March last year; and, at the beginning of October, the gasholder was completely erected—well within the time specified for completion, under penalty.

The whole of the guide-carriages are made of mild steel, and fitted with cast-steel guide-rollers.

The illustration gives a view of the holder when completed; and it will be noticed that it is flanked on either side with gasholders working within houses, which has been the custom adopted hitherto in Montreal.

The New Director of the Portsea Island Gas Company.—Mr. T. H. F. Lapthorn, J.P., solicitor, of Gosport and Portsmouth, has been elected a Director of the Portsea Island Gas Company, in succession to the late Mr. Howard Charles Ward, who was a member of the Board for fifty years.

Self-Instruction for Gas Students.—In the "JOURNAL" for the 5th of May last, we noticed the issue, by Messrs. John Allan and Co., of Bouverie Street, of a little handbook for the self-instruction of students in gas supply. It was a reprint of a series of articles by "Mentor" which had appeared in the "Gas World;" the information being conveyed in the form of question and answer. The book was intended for the use of students preparing to pass in the Ordinary Grade in "Gas Supply" at the City and Guilds of London examinations. We have now received a work on similar lines prepared for those who are desirous of passing in the Honours Grade; and its twelve chapters embrace all subjects connected with distribution, including ventilation and the law affecting gas supply. The questions, of which there are about 150, are freely illustrated. The book is uniform with the others of the series, and the price is 3s. 6d. net.

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Fig. 13.

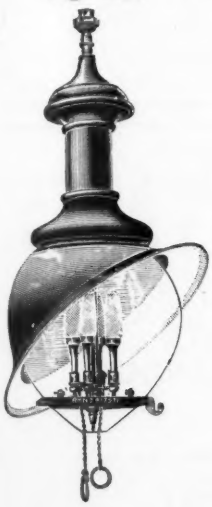

Fig. 18.

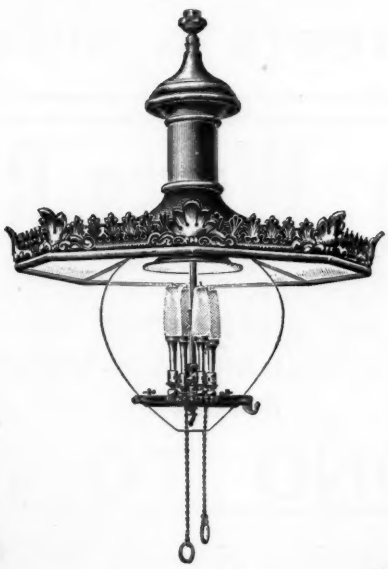

Fig. 4.

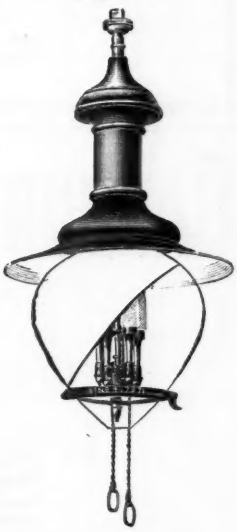

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Fig. 12.

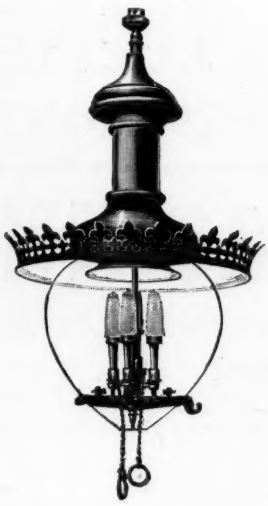

Fig. 15.

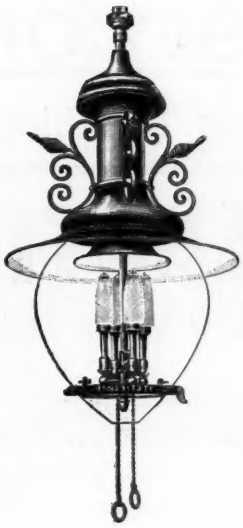

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Fig. 1.

Fig. 14.

Fig. 16.

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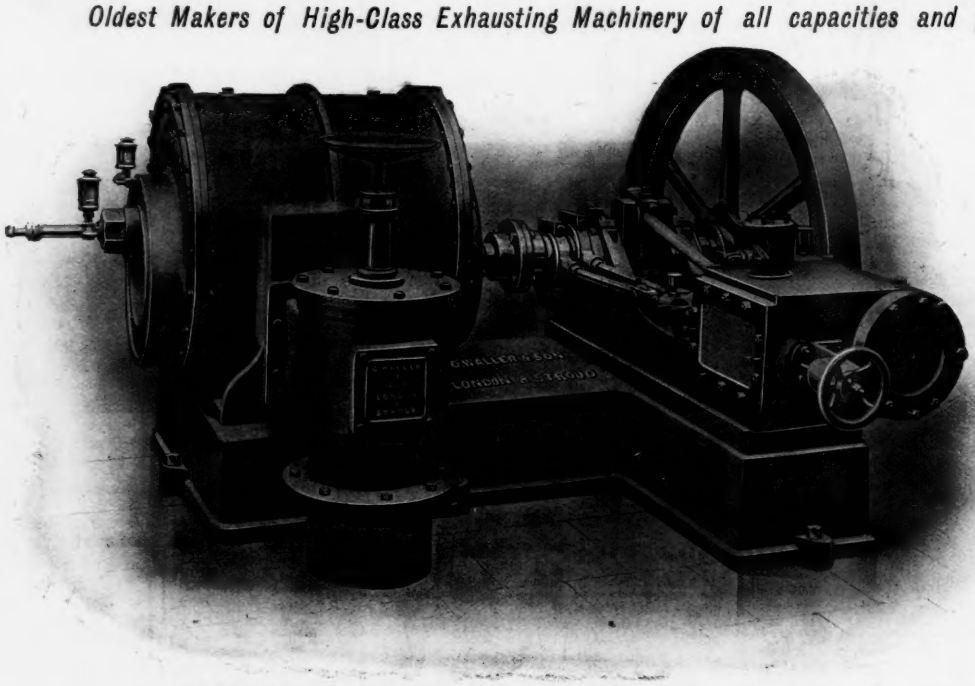

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GAS-PRODUCER FOR RETORT-FURNACES.

In the gas-producers now generally employed for heating gas-retort furnaces, a layer of red-hot coke about 4 feet thick has been found necessary to produce regular and complete transformation into carbonic oxide of the carbonic acid produced by the combustion of the air at the entrance of the grate into the producer. In order to bring about this good condition of working, it is necessary to make the producer of such a height that it has to be built in a pit below the furnace. This increases the cost of the structure, and also makes it more difficult to manage.

A producer has been designed by M. Paul Parsy, of Paris, which is so arranged that its dimensions allow of its being located in the furnace itself, in place of the ordinary grate. Combustion in the producer takes place in a horizontal instead of a vertical direction, the result of which is that the air can be made to pass through a layer of fuel thick enough to obtain complete reduction of the carbonic acid into carbonic oxide. Moreover, on account of its horizontal position, the zone of combustion always remains near the bottom of the ash-pan, so that the amount of water requisite to obtain a mixed gas of constant composition, as rich as is required, can be vaporized with the greatest ease, and without the use of special apparatus, the obstruction of which by scale often prevents good working.

The producer under notice is arranged as shown in the accompanying diagrams; fig. 1 being a vertical section through the line Y of fig. 2—a longitudinal section through the line X of fig. 1.

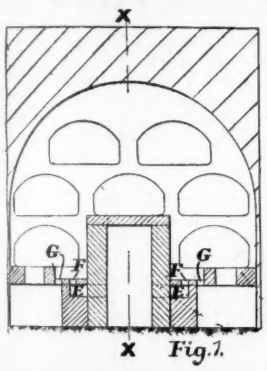


Fig. 1.

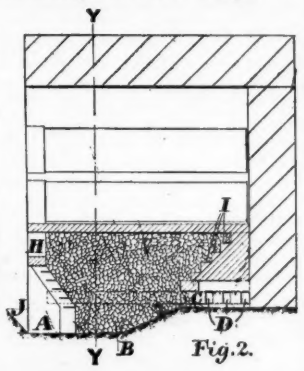


Fig. 2.

The air enters the producer through the grate A, and passes horizontally through the mass of coke B. The gases formed by combustion are drawn through the opening C, and then penetrate the channels D into the two lateral collectors E (fig. 1), which distribute them over all the length of the furnace by burners F in the combustion chamber, near the hot-air burners G in communication with the regenerators. The coke is put through the door H into the producer, which is completely filled so as to cover the steps I at the bottom, and cut off all direct passage of air through the orifice C for the exit of the gas. At the entrance to the ash-pit J a small stream of water is run, which is vaporized and absorbed by the producer, the form, details, materials, and dimensions of which may be varied without affecting the principle of the invention.

M. Parsy has patented his producer, for which he puts forward the following claims: (1) Horizontal combustion of fuel, the exit orifices for the gases produced being on the same level as the grate for the air intake; (2) uniform thickness of the layer of fuel through which the gases have to pass, and constant temperature, which ensures an unvarying quality of the gas produced; (3) great vaporizing capacity of the ash-pit water, due to the vicinity of the zone of combustion, which makes it possible to obtain the greatest calorific power with the maximum percentage of hydrogen in the gas; (4) possibility of feeding the producer with fuel while in use, without causing an intake of air or the cooling of the zone of combustion—*i.e.*, without interfering with the regular production of a good quality of gas.

Corrosion of Steel Reinforcement in Concrete.—This will be the subject of a paper to be read by Mr. Ernest R. Matthews, Assoc.M.Inst.C.E., before the Society of Engineers next Monday. The author will describe the experiments carried out during recent years in England, America, France, and Germany, as well as by himself, and give particulars of the tests and conclusions arrived at.

Prohibition of the Export of Natural Gas from Canada.—According to the Ottawa Correspondent of "The Times," an important departure in Canadian Ministerial policy has been announced. By virtue of a Statute passed two years ago, the export of natural gas is prohibited. In December, 65 million cubic feet were exported from the Niagara Peninsula to Buffalo and other points in Western New York, and 40 million cubic feet were exported in January. The Government take the view that the domestic demand has reached a point at which the entire production of gas in Canada can be consumed in the country. It is intimated that as soon as the demand for the power generated by the Canadian companies at Niagara Falls is equal to the supply, the export of electricity will also be prohibited.

IGNITION TEMPERATURES OF GASES.

At a recent Meeting of the Chemical Society, the members had before them a paper on the above subject, prepared by Professor Harold B. Dixon and Mr. H. F. Coward. The following abstract of the communication is from the "Chemical News."

The temperature to which two gases must be heated in order that, when brought into contact, they will inflame immediately, has been determined by passing an inflammable gas up a tube, terminating in a nozzle, fixed in the centre of a second tube conveying a current of air or oxygen, and electrically heated. Thus no reaction occurred during the preliminary heating of the gases. The temperature of the gas 2 mm. below the nozzle was measured by means of a protected thermo-junction.

The ignition temperature of hydrogen thus obtained was constant, within 10°, under variation of the following circumstances: (1) The rates of flow of the gases, within wide limits. (2) The size, material, and surface condition of the jet and of the walls of the furnace. (3) The rate of heating of the furnace. (4) The position of the thermo-junction, either inside or just outside the nozzle.

The ignition temperature was at first decreased some 20° by increasing the diameter of the outer tube; but a limit was then reached when doubling the diameter produced no further decrease. The temperature was raised 5° by working under half an atmosphere pressure, but decreased by 30° under a pressure of two atmospheres. The ignition temperature of hydrogen in air is the same as in oxygen.

The results obtained at atmospheric pressure are given in the following table. The paraffins and ammonia gave numbers varying with the rates of flow of the gases, as well as with the size of the furnace-tube, so that their ignition temperatures are not so clearly defined as those of hydrogen, carbon monoxide, and the other gases.

	Ignition Temperature in Oxygen.		Ignition Temperature in Air.	
Gas.	Between.	Mean.	Between.	Mean.
Hydrogen . . .	580 and 590°	585°	580 and 590°	585°
Carbon monoxide (moist) . . .	637 ,, 658	650	644 ,, 658	651
Cyanogen . . .	803 ,, 818	811	..	—
Ethylene . . .	500 ,, 519	510	542 and 547	543
Acetylene . . .	400 ,, 440	428 (?)	406 ,, 440	429
Hydrogen sulphide	220 ,, 235	227	346 ,, 379	364
Methane . . .	556 ,, 700	—	650 ,, 750	—
Ethane	520 ,, 630	—	520 ,, 630	—
Propane . . .	490 ,, 570		..	
Ammonia . . .	700 ,, 860		..	

At the close of the paper, the President (Sir William Ramsay) asked whether the temperature of ignition would not be affected by varying the proportion of the gases; for example, if the rate of flow were so adjusted as to diminish the relative amount of oxygen while keeping that of the hydrogen constant. Professor Dixon replied that alteration of the proportion of the gases within wide limits had no effect on the ignition temperature.

DESTRUCTION OF A GASHOLDER BY LIGHTNING.

At the last Annual Meeting of the American Gas Institute, Mr. D. F. Burritt, of Springfield (Mass.), described as follows how a gasholder was struck by lightning and destroyed by fire.

On the 5th of August last year, a gasholder of 300,000 cubic feet capacity, belonging to the Springfield Gas Company, was struck by lightning at three o'clock in the afternoon, and destroyed by fire. The holder and the building were a total loss. The holder was two-lift, with tank below the surface of the ground. It was surrounded by a circular brick building, rising to the height of 54 feet, with a cone-shaped slate roof of the ordinary type, and with a large ventilating cupola at the top. The construction of the building was of the most substantial nature throughout, and was well protected by two lightning-rods, which were apparently in good condition.

The bolt struck the cupola of the building and started a fire there; but what other damage the lightning did in its passage to earth is not known. It is clear, however, that certain plates in the upper lift were either disrupted or dislocated, and that some of the guides were injured so that the holder, which was nearly full, drew out of the line and blew at the cup seal, for a large quantity of gas was instantly liberated, which ignited by the fire in the cupola. The intense heat created a heavy pressure within the holder building, resulting in throwing down the walls, which fell outward, and also in further rupture to the holder shell.

The falling roof drove the holder into the tank with great force. The lower lift was so far out of line that it was caught on one side about two sheets above the bottom trucks on the top ends of the railroad iron guides in the tank, and each one cut the shell wide open from the point of contact to the top sheets of the section. This lift was made of No. 10 iron. The burning gas shot up more than 250 feet, and looked like a gigantic argand flame, the heat of which was felt quite half-a-mile away. All the gas was consumed in a very short time. After it had burned, the firemen quickly extinguished the fire in the woodwork of the wrecked building The falling walls nearly demolished the governor-house and broke

the moving parts of the governors. A part of the boiler-house was also wrecked. At the time of the accident, the inlet-valve of the holder was closed and the outlet valve open, but under control from the yard, so that no trouble was given by the connecting-pipes.

Much annoyance was caused by a large quantity of brick being thrown into the tank and one of the cups of a 2 million cubic feet holder which was near. The fourth, or bottom, section of the holder was down at the time. Several hundred bricks and other material were thrown into the tank, lodging in the submerged cup, and forming in places a pile 3 or 4 feet high at the bottom, between the tank and the lift. It was found necessary to let the holder down, cut a sheet out of the crown, and send down a diver to remove the *débris*, so that the section could be raised and landed without damage. This work the diver accomplished in two days. The holder was then raised to a point nearly ready to couple on the fourth lift, and the bricks were taken out of the cup by the careful use of tools made for the purpose. The total loss was about $35,000, and was covered by insurance.

RENEWING THE FOUNDATION OF A TANK.

The water supply for the higher planes of Pittsburg is furnished by two steel tanks, 40 feet diameter and 25 feet high, each of 235,000 gallons capacity. One of the tanks rested on a concrete, the other on a timber, foundation. The latter had been in use about ten years; and in this period the timber became so badly decayed that its replacement was necessary. The foundation was made up of layers of 4-inch pine plank laid transversely. The planks were originally thoroughly saturated with oil; and for this reason it was believed they would be durable for the purpose intended. Decay soon became manifest, however, and at the time of renewal there was little sound timber found, and no evidence existed that it had ever been impregnated with oil. The method of renewing the foundation was described in a paper read by Mr. William Martin before the Engineers' Society of Western Pennsylvania; and the following particulars were reproduced in "Engineering Record."

To remove the decayed timber and substitute a concrete foundation, it was necessary either to raise the tank high enough above the foundation for the necessary operations, or move it horizontally to a temporary site. The latter plan was adopted, as it gave free scope for operations. To do this, an embankment was built, enclosing the existing and the temporary site of the tank, forming a pond. Posts were placed in the ground corresponding to the periphery of the tank, and were also uniformly distributed to support the bottom. These posts were all set at a certain level, and were high enough to give access to the bottom of the tank for painting. When the tank was in readiness to be moved, water was taken from the second tank, which was adjacent, to fill the pond. Having previously determined that 11 inches of water was required to float it, marks were made round the tank to indicate the theoretical draught. As the filling of the pond proceeded, the water rose 4 inches above the marks, causing some alarm as to the accuracy of the calculation, for the water was getting near the top of the pond embankment. Suddenly, however, the tank rose and settled exactly at the marks. The cause of it not floating at first at the calculated draught was the decayed timber adhering so closely to the bottom as to shut out the water from the bottom area, preventing the effect of the upward pressure of the water.

Previous to floating the tank, the decayed timber foundation was pinned down with long drift-bolts driven through, where any sound enough could be found, into the earth, to prevent the timber from floating until the tank was removed. But when the tank was moved about half its diameter, the timber floated, tipping the tank and suspending operations until the timber was removed. The water in the meantime gradually seeped into the ground, settling the tank upon it.

After removing the timber, the pond was again filled, and the tank moved to its temporary site, settling on the posts referred to. The concrete foundation was built, the pond again filled, and the tank floated back to its original position. Bench marks were made before the tank was moved, so that in resetting it could be placed practically in its original position, and when located it was found to be not more than ¼ inch out in any direction. The two tanks were connected by a pipe containing a shut-off valve, so as to permit the use of one or both tanks at a time. The slight error of position in resetting threw the connecting-pipe out of line, and a new piece of pipe was substituted; but it would have been remarkable had the alignment been exact.

When all was in readiness previous to floating, the bottom of the tank was well braced on the inside to prevent upward deflection; but some arching of the bottom occurred. The necessary guy-lines and tackle for moving were made ready, and as soon as floating occurred, it was moved from one side to the other, requiring about ten minutes in transit. As a final operation to complete the work, the space between the bottom of the tank and the foundation was grouted-in. Neat cement was used, as a grout with a mixture of sand would precipitate, and not flow from the centre of the tank to the circumference. In pouring the grout, an indication of the complete filling of the space was a frothing all round the circumference of the tank, showing that the void had been filled, and making a lasting foundation.

LONDON AND SOUTHERN DISTRICT JUNIOR GAS ASSOCIATION.

A Meeting of the Association was held last Friday, at the Cripplegate Institute, Golden Lane, E.C. The chair was taken by Mr. W. A. Barnett, the Senior Vice-President, in the unavoidable absence of the President (Mr. W. J. Liberty).

The Chairman, after announcing that the next visit of the Association, which would be to the Croydon Gas-Works, was fixed for April 17, and that the postponed visit to Woolwich Arsenal would take place some time during May, called upon

Mr. C. J. Dickenson Gair to read a paper, entitled

SOME EXACT METHODS OF TECHNICAL GAS-WORKS CHEMISTRY.

It will be readily understood that the subject under discussion this evening is far too great to treat of in anything but a cursory way in one paper. It is not going too far to say that a text-book might with advantage be written on it. I trust, therefore, that I shall be pardoned for the general manner of its treatment.

Never was there a time in the history of industrial chemistry when it was more urgent for manufacturers, engineers, and others to know the composition quality, &c., of goods, to the last milligramme, than it is now. Competition is so keen, and trade in many branches so poor, that large margins nowadays are quite impermissible; and the chemist, if he would justify his existence, must be exact both in the methods he employs and the manipulation of the methods themselves. The gas chemist equally shares with his other brethren the strenuousness of modern times; and it is as necessary for him to be exact as anyone else. A good deal of misconception exists as to the word "exact" as used in chemistry; so let us try to define an exact method. I do not think it is going too far to say that an exact method is one which, from the taking of the sample to the actual finish of the analysis, bears scientific scrutiny and criticism. Though this definition is all right from a theoretical point of view, practically it is not enough. The personal equation of error plays a prominent part in all tests, and the more difficult and elaborate a test is, the greater the personal error becomes; so that, while a test may bear scientific criticism about its reactions, yet it may fail by reason of its complexity. How many tests are there which are formulated, published, and immediately pass into oblivion, still-born. Let me say at once that simple exact methods, based on old methods, if you will, are the ones required to-day. On the other hand, we want no rule-of-thumb chemistry, which must inevitably lead to confusion and inaccuracy. Personally, however, I have always found rule-of-thumb the consequence of lack of interest or lack of common sense, or lack of both.

Now, there is a tendency sometimes to sneer at the very careful man; and, in consequence, I take it, he is becoming something of a *rara avis*. In the same way, careful exactitude itself is sometimes treated as a fallacy, and it too may become scarce. The students of a certain technical college once used to say that the more carelessly combustions of organic substances were done, the better the results came out. I believe that this superstition still lives, not only in technical college laboratories, but in others also. The more scientific work (whether in the nature of routine or research) one does, however, the more it becomes apparent that attention to details ensures a degree of truth in the results which is most valuable. Perhaps this exactness in manipulation is more necessary in practical gas chemistry than in any other. It is hard enough to hit on exact methods, even with care; but lack of it immediately ruins everything.

If we think for a moment what a complex substance coal gas is, we shall realize how difficult it must be to completely separate any one substance from it by means of chemical reagents. To a metallurgical chemist, the simplest thing in the world is the complete separation of the common elements; but what gas chemist can ever say that he has completely separated carbon dioxide from coal gas, and estimated it to 99·5 per cent. accuracy? Now, 99·5 per cent. accuracy is only a medium standard for a solid or liquid analyst to work to. In this case, therefore, I think it will be generally agreed that we must fix a standard of exactness somewhat lower for the methods of gas chemistry than for others. Now, 98·5 per cent. accuracy seems a fair figure; and for purposes of comparison I shall keep to it in this paper.

Sampling.

One of the most important points to remember in gas analysis is the great care which must always be taken in sampling. We must estimate the actual amount of a certain constituent of the gas in the main, and nowhere else, if we would arrive at the correct result. For instance, it will avail us but little to avoid india-rubber tubing in a naphthalene test if we allow the inlet service to get choked with naphthalene crystals. Manifestly, in a case like this, our results will be far too low, inasmuch as we are not estimating the amount of naphthalene in the main, but in a fictitious sample of no use to anybody. This particular trouble can, of course, be obviated by having the test quite close up to the main, and the short inlet service steam-jacketed. With this arrangement, I have never found the slightest trace of solid naphthalene, except in the glass inlet-tubes of the first bottle. This deposit can be easily washed out with a little alcohol, and added to the test. The gas chemist, if he would be accurate,

must ever be on the lookout for difficulties with his sample. Not only the naphthalene test, but every other, wants great care and thought in this direction. Thus the sulphuretted hydrogen test will be rendered inexact if iron piping in any length is used. Zinc or india-rubber tubing should always be substituted. On the carbon bisulphide, &c., tests, whether Referees' or Harcourt's, india-rubber tubing is impermissible, and glass or iron tubing should be used. In the ammonia test, on crude gas, especially near the scrubbers, an empty Dreschel bottle, with short inlet-tube, interposed between the main and the first Dreschel bottle, containing N/1 H_2SO_4, will make the test more accurate, by collecting any superfluous liquor draining over.

Indicators.

A great hindrance to exact work in gas chemistry has been the lack of a perfect indicator in acidimetry. This is a great necessity throughout the analytical world; but it is perhaps most felt in a gas laboratory, inasmuch as in coal gas and its bye-products substances are found which terribly affect even the best indicators. For instance, the presence of large quantities of free carbon dioxide makes the use of the litmus indicator in liquor testing a source of grave error; the presence of free sulphuretted hydrogen ruins the end reaction of methyl orange; and so on. This last-named indicator has been looked upon as excellent in every way; but, apart from the fact that it is not affected by carbon dioxide, I cannot help thinking that this notoriety is somewhat unearned. The end reaction is not very definite; by gaslight it is absolutely untrustworthy. What is wanted is an indicator which will give a definite colour with acids and the complementary colour with alkalis, and be unaffected by carbon dioxide. Fortunately there is such an indicator, though its use is at present usually limited to picric acid titrations. I refer to lacmoid. This indicator, in my experience, is infinitely to be preferred to any other. The end reaction, from the red of acids to the blue of alkalis, is extremely sharp; and carbon dioxide has no detrimental effect. Of course, with picric acid the colour is brown, turning to green when the acid is neutralized—free carbolic acid tending to mask the end reaction. But, apart from this extremely rare occurrence, the indicator may be used with every confidence.

Tests Used in Gas-Works.

After these preliminary remarks, let us critically examine a few of the commoner tests used on gas-works.

Ammonia Test.

The first test I propose to examine is the works ammonia test on foul gas. Of course, the fouler the gas the more difficult is it to estimate the ammonia content correctly; but, with care and thought, even an ammonia test on the crudest gas may be made to conform with our 98·5 per cent. accuracy standard. I have already mentioned the fact that it is necessary to have an empty Dreschel bottle in front of the bottles containing N/1 H_2SO_4. This effectually arrests any liquor and tar from the main. Tar-filters should be altogether dispensed with, as they not only catch tar but ammonia also. The test having been connected, the gas should be passed at the rate of about 0·5 cubic foot per hour, and as little used as possible. When (say) 5 cubic feet have been registered, the test is disconnected, and, if there is much discoloration of the solution, not directly titrated, but transferred to a flask, and the test finished in exactly the same way as a liquor test, N/10 H_2SO_4 with the lacmoid indicator being used to titrate back the ammonia liberated.

Let me here urge the importance of always taking out the sulphuretted hydrogen from the gas, so that the meter shall not be injured thereby. It is always so absolutely essential that the meter be accurate that it should often be examined, with the Gas Referees' 1-12th cubic foot measure. Through taking out the sulphuretted hydrogen by means of an oxide purifier, after the ammonia test-bottles, there will be a slight error occasioned in the quantity of gas registered. This is not likely to amount to more than −0·1 cubic foot; but it should be calculated and allowed for.

Of naphthalene tests nothing further need be said, as the subject has been thoroughly discussed on more than one occasion before the Society of Chemical Industry.

Carbon Dioxide Test.

The next test to be considered is the carbon dioxide test. Three methods of estimation are commonly employed. The first is the soda-lime method; the second, the barium hydrate volumetric method; and the third, Harcourt's colour test. The last method is so absolutely unreliable and inexact that no more need be said about it. As regards the other two, the most exact is undoubtedly the barium hydrate test; and if proper precautions are taken, such as excluding air, as far as possible, during filtration, the test may be classed as an exact one. The chief things to remember are that not more than a cubic foot of gas should be used, and this passed at such a rate that the bubbles of gas through the solution may be easily counted.

The chief things that militate against carbon dioxide tests are the cyanogen and carbon bisulphide present in the gas. As regards the former, it is absorbed by both the barium hydrate and the soda-lime method, but does not cause an error of more than + 1 per cent. The carbon bisulphide, on the other hand, will not combine to any appreciable extent with barium hydrate solution, but does combine with soda-lime, thereby raising the working error in this latter test to a total of about + 2·5 per cent. It is a common thing to see soda-lime coloured green by the action of the carbon bisulphide even in purified coal gas.

Sulphuretted Hydrogen Test.

This test comes next; and here again the gas chemist has really only one method which can be classed as extremely accurate. I refer to the cadmium chloride method, described in Royle's "Chemistry of Gas Manufacture." I need not give the test in detail; it will be sufficient to say that the gas is slowly bubbled through an acidified solution of cadmium chloride. The yellow precipitate of cadmium sulphide formed is filtered off, and oxidized by means of bromine to cadmium sulphate, which is precipitated with barium chloride. It might be an advantage at the end to acidify the cadmium sulphate solution with nitric acid instead of hydrochloric acid, and precipitate the sulphate with barium nitrate; but the method leaves little to be desired, either as regards accuracy or convenience. With respect to the well-known phosphate method, this is inconvenient and not strictly accurate, inasmuch as practically the whole of the cyanogen in the gas is absorbed. The iodine method is, at the best, only approximate, inasmuch as the other sulphur compounds in the gas set up chemical reactions with it. Harcourt's colour test may be rendered surprisingly accurate in experienced hands; but it would be incorrect to call it an exact method. There is no colour test yet devised that can be relied upon to 98·5 per cent. accuracy, inasmuch as probably no two people see exactly alike, either as regards intensity or tint of colour.

Carbon Bisulphide Test.

The same remarks apply to Harcourt's carbon bisulphide colour test, which is the only known carbon bisulphide test worth anything. However, Harcourt's test may be rendered exact by joining the platinized pumice bulb up to two or three Dreschel bottles containing cadmium chloride solution, and gravimetrically estimating the sulphuretted hydrogen formed. A meter will, of course, be necessary; and about 2 cubic feet of gas should be used.

Hydrocyanic Acid Test.

The caustic potash and ferrous sulphate method is the one usually employed; and, with slight modifications, it may be made quite accurate. Most text-books rightly remark that sulphur is precipitated with the prussian blue, and will, if not dealt with, cause considerable error. The method of elimination, by acidifying the ferrocyanide solution with hydrochloric acid, and precipitating the sulphur as barium sulphate, is clumsy and ineffective, inasmuch as, after long toil, it only gets rid of soluble sulphates; whereas sulphur often separates out in the pure condition, and, of course, cannot then be thus dealt with. Undoubtedly the simplest and most accurate way to finish the test is to precipitate the prussian blue with ferric chloride, filter, wash the precipitate free from excess of ferric chloride, soluble sulphate, &c., and burn the precipitate to ferric oxide, from the weight of which the hydrocyanic acid is easily calculated. There is also a volumetric method, using a standard zinc sulphate solution. But as ferric chloride is used as an outside indicator by means of indefinite spot reaction, not much reliance can be placed on the results found. A very simple and exact method may be based on the reactions of the Foulis technical process of extraction; but time will not permit me to describe it.

There are many other tests which might be criticized in a similar manner to the above; but the few I have brought briefly before your notice will have shown you how carefully even an apparently straightforward, well-established test should be examined before being finally adopted as exact.

Methods of Analyzing Bye-Products.

The second part of my paper deals with the methods of analyzing some of the bye-products of gas manufacture, such as liquor, spent oxide, &c. The subject of liquor-testing, in its complete aspect, is too great to examine in detail here; but much yet remains to be done before it is possible to make a complete analysis of liquor with the same accuracy as it is to completely analyze spent oxide of iron. Since burnt spent oxide has become an economical material for purification, it is necessary for engineers to know accurately the percentage of ferric oxide remaining in their ordinary spent oxide of iron, together with the separate amount of prussian blue. A method which I have found exact and convenient for doing this may be run through as follows: The sulphur is extracted from the oxide in the usual manner, and after being thoroughly dried, one gramme of the residue is weighed out, and washed on to a filter, where it is further washed with hot distilled water, to free it from soluble ferrocyanide, thiocyanate, &c. The remainder is transferred to a beaker and digested for (say) three hours with about 100 c.c. concentrated potash solution. The residue is then filtered and thoroughly washed with hot water. Dealing with the filtrate first, it is acidified with hydrochloric acid and an excess of ferric chloride added; pure prussian blue being precipitated. The solution with the precipitate is now allowed to stand in the hot-water oven for a while, to allow the blue to coagulate, which is then filtered, washed free from ferric chloride, and burned to ferric oxide. The weight so found multiplied by 8600 and divided by 56 gives the percentage of prussian blue in the desulphurized sample. This figure is further corrected to the percentage on the dry basis of oxide.

The residue remaining from the treatment with potash is now dealt with. A hole is made in the filter-paper, and the residue washed through, into 200 c.c. of strong hydrochloric acid and a little concentrated nitric acid. The residue is now digested with the acids for a few hours. When all the ferric oxide is decomposed, the solution is filtered, the filter-paper thoroughly washed with boiling water, and ferric hydrate precipitated by neutralizing the solution with excess of ammonia. If alumina is present, it will be necessary to separate it from the iron by the usual method. The ferric hydrate is collected on a filter-paper, washed, and then burnt to ferric oxide. From the weight thus found, the percentage of the total ferric oxide seemingly in the dry spent oxide is calculated. Now part of this total ferric oxide found, is not really present as ferric oxide at all, but has simply been liberated from the prussian blue by the decomposing action of the potash. To find the separate percentages of prussian blue and ferric oxide present in the spent oxide, a deduction must be made according to the equation:—

$$Fe_7(CN)_{18} + 12KOH = 3K_4Fe(CN)_6 + 2Fe_2O_3 + 6H_2O.$$

That is to say, in decomposing the prussian blue, ferric oxide has been liberated, and has been estimated as active material, which it by no means is.

From the preceding equation, we find that 860 parts of blue are decomposed into 320 parts of ferric oxide. Therefore if (say) 10 per cent. of prussian blue had been found in the dry oxide, 3·72 per cent. of ferric oxide must be deducted from the total ferric oxide result on the dry basis. The result gives the actual percentage of free ferric oxide in the oxide. By continuing the analysis of the insoluble residue from the ferric oxide estimation, a complete analysis of spent oxide of iron may be made from one sample.

Naphthalene in Tar and Tar Oil.

It is often necessary to estimate naphthalene in tar or tar-oil; and the following method may be of interest to those who have been called upon to do so: In spent or partly spent tar oil, there is always a small percentage of naphthalene which will not combine with picric acid. These naphthalene derivatives are so insignificant in amount that they are of no consequence; but, for purposes of strict accuracy, in this method the result should be stated as naphthalene capable of forming naphthalene picrate present in tar-oil. The method is as follows: 1 c.c. of the oil or tar is taken, preferably with a 1 c.c. pipette, and is transferred to a 200 c.c. measure, and agitated with a sufficient quantity of absolute alcohol (usually about 10 c.c.) to form a solution, or in the case of tar, a partial solution, which is decanted. About 200 c.c. of strong picric acid are now added, and an impure naphthalene picrate separates out on agitation. This is filtered off and drained by means of a filter pump. A hole is now made in the bottom of the filter-paper, and the precipitate washed through, with cold water, into a 300 c.c. Erlenmeyer flask, which is fitted with a cork, through which a length of glass tubing projects almost to the bottom. About 150 c.c. of water are further added, and half a stick of potassium hydrate. The outlet-tube of the flask is now closely connected to a train of three Dreschel bottles, the first two containing about 250 c.c. of acetic acid, of 1·044 sp. gr., and the third 150 c.c. of concentrated picric acid solution, to act as a catch. The outlet of the last bottle is attached to a filter-pump, and air drawn through fairly briskly. Heat is now gradually applied to the Erlenmeyer flask, until the solution has nearly reached boiling-point. It is kept at this temperature, in a state of incipient ebullition, for about half-an-hour, after which all the crude naphthalene picrate will have been dissociated into naphthalene vapour (arrested by the acetic acid) and picric acid. The inlet-tubes of the apparatus will be found sufficiently hot to prevent the deposition of crystalline naphthalene; but should any slight quantity be found farther on, it may be washed out with a little alcohol and added to the test. After heating the solution for the half-hour, the bottles are disconnected, and the dissolved naphthalene as naphthalene picrate immediately precipitated by excess of strong picric acid solution. The naphthalene picrate so formed is found to be very pure, and should be filtered, washed free from acetic acid by means of dilute picric acid, thoroughly drained on the filter-pump, and boiled with distilled water for a few minutes. The picric acid so liberated may then be titrated with N/10 sodium hydrate, each cubic centimetre of which corresponds to 0·0128 grammes of naphthalene. From the weight of naphthalene so found in 1 c.c. of oil, the grains or pounds per gallon may easily be calculated.

Gas Analysis.

Let us look now for a few moments to the all-important subject of gas analysis, by which is usually meant the estimation of each separate constituent of a gas by means of progressive absorption. Not nearly so much of this kind of work is done on coal gas as formerly, the apparatus being kept busily at work on producer, furnace, and water gas analyses. Nevertheless it is advisable to use apparatus which can be adapted to both complete analyses of coal gas and simple analyses of furnace and other gases. The Orsat apparatus is largely used for the latter purpose on gas-works, simply because of its portability and easy working. But it is not by any means accurate, and its use is practically limited to the estimations of carbon dioxide, carbon monoxide (for which purpose it is painfully slow), oxygen, and hydrogen. The statement that the Orsat apparatus is not exact may cause some surprise to its constant users; but a careful study of it will prove this to be the case. Who that has used one does not know that, however carefully it is handled, bubbles constantly get entangled in the capillary tubing of the pipettes? And these bubbles defy all tapping to dislodge them. This creates a most serious and a constantly changing amount of inaccuracy. Another difficulty is found in the tendency of the capillary tubing to drop into the U-shaped connecting tube between the two sides of the pipette; thereby acting as a gas channel, through which gas constantly escapes, usually unnoticed with dark absorbing liquids. Thus if the gas is kept flowing up and down the pipette, the percentage of a certain constituent of the gas may be augmented indefinitely. This nuisance can be rectified by the manufacturer substituting capillary tubing in the U connection of the pipette. Yet another source of inaccuracy lies in the width of the pressure-bottle, which makes the true levelling of the containing liquids difficult.

Of course, it is impossible to get strict accuracy with any apparatus if water is used as the containing liquid, owing to the fact that different quantities of aqueous vapour and dissolved gases may be given off at different temperatures. On the other hand, the amount of gas absorbed by the water is an unknown quantity. It has been proposed to use water saturated with the gas to be tested; but the so-called cure is worse than the disease itself, inasmuch as the dissolved gas can by no means be counted upon as remaining dissolved. Next to mercury, a strong solution of common salt is undoubtedly the best liquid to employ; and the error is so slight as to be practically negligible. Of course, mercury is the best liquid of all to use—indeed, with explosions it is indispensable; and all gas-analysis apparatus should be made strong enough to withstand the additional pressure of its occasional substitution.

There can be no reasonable doubt that the most accurate apparatus for ordinary gas analysis is Hempel's, and none of the objections urged against Orsat's apply to it. Its great defect is lack of portability and general awkwardness in working. Surely nothing is more ungainly than a Hempel pipette. Take away this importability and awkwardness, and there is an apparatus which may be counted upon as accurate both in elaborate and simple analyses. The apparatus I have here this evening is really a combined Hempel and Orsat, for it may be used as either. Certainly, in form it is similar in appearance to Orsat's; but the method of using it is generally the same as that employed by Hempel. The pipettes are not fixtures, but, by the use of stop-cocks to prevent escape of gas, are removable. After removal, with the contained gas, they are shaken for 15 to 30 seconds (in the case of carbonic acid) to a minute or two (in the case of carbonic oxide), and then replaced. In this way each particular constituent of the gas can be separately estimated in a minimum time, owing to the fact that skaking the gas with the absorbing liquid ensures the maximum surface of the latter being exposed. The levelling-bottle is elongated; thus rendering it possible to take accurate readings on the burette, and also facilitating the rate of flow of the gas and the containing liquid in the capillaries of the apparatus. A special explosion pipette is used in estimations of methane, &c. The reagents employed are the same as in all other gas-analysis apparatus. I might mention that for estimating carbonic oxide it is a great advantage to always use acid cuprous chloride solution.

Photometry.

Now just a word, in conclusion, about photometry. This subject belongs rather to gas-works physics than chemistry; but physics and chemistry are always so intimately connected that it is impossible to speak of the one without the other. In photometry there is no doubt the personal equation element enters more largely than in any other test used on a gas-works. When a certain party of astronomers were sent to distant lands some years ago to observe the transit of Venus, each man had a ticket bearing the amount of his own personal equation of error in judging time, &c. It is a pity that photometrists cannot be ticketed in the same way. Yet we have an apparatus two-thirds of which is correct. The standard burner as used in London is perfectly scientific and exact; the 10-candle standard has practically no serious fault; and yet the absolute trustworthiness of the test is spoilt by what would appear to be the simplest part of the apparatus—namely, the photoped. The fact is well known that unless the lights from the two sources are of the same colour or tint, it is a matter of considerable difficulty to get exact readings on the photoped. I have certainly found it a good plan to get the lights as nearly equal as it is possible to determine, and then to confirm by alternately looking at them first from about 3 inches to the left of the photoped and then 3 inches to the right. This has the effect of throwing each side alternately into shadow; and a comparison of the two shadows as well as the two lights helps in getting a true reading.

In this connection, the theory of the "Flicker" photometer is interesting. In the Simmance-Abady "Flicker" photometer, it will be seen that light from the two sources is received upon a pure white wheel, which may be revolved at almost any desired speed by means of a clock-work motor. The periphery of the wheel is formed of two equal conical surfaces, the intersection of which crosses the line of sight. When in motion, and on looking through the eyepiece, these surfaces are alternately seen. Now, if the two sources of light illuminating the surfaces are dissimilar in intensity, a continual flickering effect is noticeable; but on moving the photoped either one way or the other, a point is reached when there is equal intensity of light on both sides of

the wheel, which condition is indicated by the sharp disappearance of the flicker. As regards the explanation of the phenomenon, the most probable theory is that the ever-changing size of the pupil of the eye fails to keep in time with the rapid change of intensity of illumination shown by the two sides of the screen. Be this as it may, the fact remains that, though the two sources of light may be totally dissimilar in tint—as, for instance, the light of the pentane standard against the light of an incandescent mantle—extremely exact readings can be obtained. It has also been proved that visual defects—astigmatism, colour blindness, &c.—do not detract from the accuracy of the readings.

The three important things to remember in working the ordinary "Flicker" photometer are: First, the revolving wheel must always be kept perfectly horizontal with the 10-candle standard and the argand or other burner, as shown by the images cast by the side lenses; second, the wheel must be kept absolutely clean and dead-white; and, third, the rate of revolution of the wheel must not be too high. Unfortunately, a "flicker" head is not yet on the market which is adaptable to the table photometer; but we trust that the difficulties in the way will be surmounted, as there is no doubt the advantages of such an appliance would be considerable.

One is tempted to speculate about this fascinating subject of photometry. Certain it is that the last word has not yet been said on it. It may be the chromatic photographic plate will be the determining factor of the future, and that the same certainty of measurement, or rather estimation, will be displayed as regards light as is now possible in the separation of the elements.

Discussion.

Mr. D. W. Winslow said their thanks were due to Mr. Gair for the trouble he had taken to give them such a practical paper. He (the speaker) was particularly interested in the apparatus the author had on the table—the combined Hempel and Orsat—and the better effect that was obtained by being able to shake up the gas in the burette. Mr. Gair described the prussian blue test on spent oxide. Was this prussian blue of any value, or was the oxide merely sold for the sulphur contained in it?

Mr. Gair replied that the prussian blue was at any rate of value in regard to the fact that it was a source of ferric oxide when burnt. If they had 10 per cent. of prussian blue, this represented an additional 3·72 per cent. of ferric oxide, which they could count upon in the oxide. In other words, when prussian blue was burnt in the atmosphere, it was burnt to ferric oxide, which became a valuable purifying material. As regarded his own Company, which he had more particularly in mind, Mr. J. Tysoe, of East Greenwich, had recently read a paper dealing with "Burnt Oxide," in which it was pointed out that if they burnt the oxide for the sulphur the residue need not necessarily be practically thrown away, but could be used again for purification purposes; and, of course, the blue entered into this considerably. If there was only 5 per cent. of prussian blue, this represented 1·86 per cent. of ferric oxide; and therefore it ought to be taken account of when selling. As regarded other things, prussian blue was sometimes utilized for the manufacture of sodium or potassium ferrocyanide.

Mr. A. K. Sproxton said there was a point which had occurred to him, and on which he had been seeking information. In the test prescribed by the Gas Referees for sulphur compounds other than sulphuretted hydrogen, how could they be sure when they finally precipitated the solution with the barium chloride that the whole of the sulphur from the gas was fully oxidized to ammonium sulphate, and none was present as sulphite? As far as he could remember the test, no oxidizing agent whatever was used. It would be very unfair to take the barium precipitate as being all sulphate, if some of it might be sulphite. He did not think, however, barium sulphite would precipitate in their acid solution.

Mr. Gair said this was a matter he had intended to mention, had his paper not already been so long. There might be a very minute amount of sulphite unoxidized. The oxygen of the atmosphere was the all-sufficient oxidizing medium in this test. If they wanted to be sure of complete oxidation, all they had to do was to acidify with nitric acid, and precipitate the sulphate with barium nitrate. He did not know why this was not done. There was no doubt that by the method he suggested they could be absolutely certain of accuracy.

The Hon. Secretary (Mr. J. G. Clark) said Mr. Gair had dealt with indicators for ammoniacal liquor. Ammoniacal liquor, as they all knew, was a most complex material, containing among other things, large quantities of carbonic acid and sulphuretted hydrogen in different forms. The presence of these gases had various effects upon the indicator used for titration work; but he must say that he had always found cochineal solution very satisfactory. It appeared to be but very little affected by the gases. In regard to the estimation of carbonic acid and sulphuretted hydrogen, he had found a modified form of the Wanklyn bottle very useful indeed. The modification, which he believed was due to Mr. Lacey, consisted in making the bottle in two pieces, so that they could be joined by a ground joint. By these means, the bottle could be quickly dried by wiping out with a duster; and in this way the errors caused by using a wet bottle were avoided. The stopper of the bottle was a conical flask, into which a measured quantity of the reagent was placed. The gas might be led by a glass tube into the dry bottle; and when fully charged the hollow stopper was replaced, and the whole inverted and shaken. The bottle might then be stood upon its stopper, so that the reagent might drain thoroughly into the stopper. The titration was then made in the stopper without any transference and consequent errors. He had found that, with care, this method was very reliable; and since a meter was not required, the whole thing was most simple, and was particularly useful when studying a gas stream. With regard to gas analysis, his experience was that, with certain precautions, the Bunte burette was capable of giving very accurate results indeed, and could, in skilled hands, be used for the most refined work. Referring to the Simmance-Abady Flicker photometer, he said he had always regarded this apparatus as a very beautiful instrument of precision. Mr. Gair had alluded to the speed of the flicker wheel. The speed which gave the most exact results depended upon the illumination. In all photometric methods, the observer approached the point of balance from both sides; and it should be the aim of the observer to adjust the conditions so that the readings obtained should be as nearly as possible coincident. In order that this could be done, a higher speed was necessary for the higher illuminations. In fact, there appeared to be a particular speed for each degree of illumination at which the readings from both above and below the balance-point were coincident. It was very easy, by the governing mechanism in the apparatus, to regulate this.

Mr. F. C. Canning remarked that the author spoke of the Orsat apparatus, and found it inaccurate. Could he say whether he had ever tested this apparatus against any other form? Mr. Gair had alluded to the inaccuracy caused by the bubbles getting into the capillary tubes.

Mr. Gair replied that he had tested the Orsat apparatus against the one he was showing that evening. The Orsat might be correct occasionally; but there was no constant reliance to be placed upon it owing to this entangling of bubbles by the capillary tubes of the pipettes. Though occasionally it would be found to agree with the Hempel, usually it was decidedly inaccurate. And this was not only as regarded the bubbles in the pipette—an elongated column of water being absolutely necessary to enable a proper reading to be taken.

Mr. Wedd asked whether the author found any difficulty in making the rubber connections in the Hempel apparatus, or his modification of it, so as to prevent a trace of air getting in.

Mr. Gair replied that they never had any difficulty in this respect. The glass tubes were made with exact fitting ground surfaces, and the rubber connections were specially made for the purpose in view.

The Chairman said he had been given to understand that petroleum had been used as a confining liquid. There were, of course, continuous changes going on when different analyses with any apparatus were being carried out—changes of temperature, pressure, and moisture—all of which exercised a considerable influence on volume. Each of these changes might introduce a slight error. The importance of the accurate calibration of measuring glasses was a matter that should be borne in mind in these days of cheap apparatus. As to meters, the author said that if the meter was wrong everything was wrong. He thought it was generally admitted that 1 oz. of water too much in a meter made + 1 per cent. of difference in the volume passing through the meter.

Mr. Gair, replying to the Hon. Secretary, said he did not think it could be claimed that Mr. Lacey's was an exact method. The subject that night was "exactness." After all was said and done, everything should not be sacrificed to rapidity. Occasionally it was necessary to take time for tests, instead of rushing them through and getting an approximate result. There were instances in which an exact method was absolutely essential. As regarded quick sulphuretted hydrogen tests, the Harcourt colour test in experienced hands could not be excelled. It would correspond surprisingly with the Referees' sulphur test. As regarded cochineal, undoubtedly it was a very beautiful indicator; but the colours were not complementary to one another. It was slightly affected by carbonic acid; and he thought in some cases where there was a lot of sulphuretted hydrogen, it was absolutely bleached. Of course, this could be counteracted by using more cochineal. Mr. Clark also mentioned the Bunte burette. He (Mr. Gair) did not think they could assume that the Bunte burette could be taken as giving 98½ per cent. accuracy. It was a useful thing on a works, and, of course, was accurate within limits; but they could not take it as absolutely accurate. For instance, it was not usually water-jacketed; and this caused considerable error. He believed there was a use for the Bunte burette; but another objection to it was the fact that it was not absolutely self-contained, and in shutting and opening cocks an error might creep in. As regarded the Flicker photometer, of course, they must graduate speeds. He did not mean them to infer that it was always necessary to keep to one speed; but in working on 14 to 16 candle gas with an argand burner, he had found a low speed best, whereas with an incandescent gas-burner and mantle a higher speed was essential. The greater the intensity of the light, the higher was the speed required with the Flicker photometer. He had forgotten to mention the Methven screen, which would make, it had been suggested, more accurate determinations possible. He had not tried the experiment; but it would be interesting to see whether the Methven screen would not make a test very much sharper in its initial result than was the case now either with the table or even the Flicker photometer.

The Chairman proposed a hearty vote of thanks to Mr. Gair for his paper, and said the Association would be pleased to see him on another occasion.

The vote was seconded by Mr. Canning, supported by Mr. S. A. Carpenter, and heartily accorded; Mr. Gair briefly acknowledging it.

SCOTTISH JUNIOR GAS ASSOCIATION.

Visit to the Carron Iron-Works.

On Saturday afternoon, a joint visit of the Eastern and Western Districts of the Scottish Junior Gas Association was made to the works of the Carron Company, near Falkirk. There were about eighty members present, among whom were the Presidents of both districts. The visitors were received by Mr. A. N. Boych (Chief of the Commercial Staff), Mr. H. Carr Roberts (the representative of the Company in Scotland and the North of England), Mr. J. R. M'Ewan, Mr. J. Higgins, Mr. A. S. Hughes, Mr. Phil Hayward, and Mr. W. Hay. These gentlemen acted as guides in the tour of the works.

The Carron Company is in some respects the most wonderful of Scottish industrial bodies. It is a private Company, founded in 1759, by Dr. John Roebuck, of Sheffield, an eminent scientist and mineralogist of his time, and the discoverer of some important improvements in the production of iron. It has an unbroken business record of 150 years. The chief feature of the Company is its self-contained nature. It is the owner of almost all the supplies of raw material it handles; the greatest exception being the importation of iron ore from Spain and elsewhere. It owns iron mines; coal mines, from which it sells gas and other coal; coke-ovens, in which it makes the coke used in the works; clay pits, from which it derives fire-clay, and manufactures goods for its own use; limestone pits; a fleet of steamships, which carry both passengers and goods; and land, used for works and farm purposes. At the present time, the principal works cover an area of 25 acres; but, in addition, there are large subsidiary works in the locality. The number of workpeople employed is about 5000. In the early days of the Company, the period being somewhat belligerent, an extensive business was done in war material; but at the present time one of the largest departments is that of the production of appliances for cooking and heating by gas. The blast-furnaces at Carron have the largest capacity of any set of furnaces in Scotland; the output at present being about 500 tons of pig iron per week. To provide the blast for these furnaces, there are two steam-engines—one of 850 H.P. erected in 1906, and one of 600 H.P., made at the works in 1863—which are used alternately. The gas which is evolved in the process of smelting is used in huge cylindrical ovens, to heat the air blast, on the regenerative principle; and there is sufficient gas over and above to fire the steam-boilers. There is no recovery of residuals. There is a very complete installation of steam-driven electric plant, for the provision of light and power.

Having looked at all these, the visitors were taken to the gas-cooker fitting shop—an extensive and airy apartment—where there was a vast amount of material on hand, including large orders under contract for the Corporation of Glasgow. The appliances seen consisted of cookers, fires, radiators, grillers, carving tables, boiling tables, hot-closets, roasters, bakers' ovens, confectioners' ovens, water-boilers, tea-infusers, combination ranges, baking plates, boiling burners, irons, &c.

At the close of the tour of inspection, the company assembled in the Board-room, where refreshments were served.

Mr. A. H. Whitelaw, B.Sc., of Glasgow, the President of the Western District, asked them to accord to the Directors of the Carron Company a hearty vote of thanks for their kindness in throwing their works open to them that afternoon. He would like also to include the members of the staff, who had shown them round. They had succeeded in making the visit a very interesting one.

Mr. A. Morton Fyffe, of Dundee, the President of the Eastern District, in seconding, said he was sure they all felt very much indebted to the Company and the staff for what they had done. The value of the visit had been enhanced by the fact that the two districts had come together that day; and he would just throw out the suggestion to the office bearers for next session that another joint meeting might be arranged, if possible in some city, where they might have a social gathering in the evening, through which the members might come to know each other better. They in the Eastern District had now come to the end of their session. It had been a very successful one; and it was most fitting that they should meet with the Western District at the end of it. He hoped that the friendship between the two districts would become stronger thereby.

Mr. Whitelaw added that it had been a great pleasure to the members of the Western District to meet the members of the Eastern District. They of the West looked forward with pleasure to having a joint meeting next session, either in Glasgow or else in Edinburgh.

The motion was very cordially adopted.

Mr. Boych, on behalf of the Company, thanked the speakers for their remarks, and the members for their vote. It had given them every pleasure to show the visitors through the part of the works they had seen. It would have been a greater pleasure if the visit could have been arranged when they were in full working order. Unfortunately they had a strike on at the present time, in consequence of which they had not been able to show all they could do, especially in the gas section. At a future date he hoped they might arrange a visit when they would be in full swing; and he was sure they would do everything they could to show them all that was being done in the works.

CONSTRUCTION AND WEAR OF ROADS.

Under the above title, Mr. H. R. A. Mallock, F.R.S., gave a paper at the Institution of Civil Engineers last Tuesday. The author found, on looking through a large quantity of the literature on the subject of roads, that it had been treated almost exclusively from a practical standpoint. His contribution partakes of the nature of a theoretical consideration of the question—divided into foundation, surface, drainage, and formation of dust.

He pointed out that the foundation should be strong enough to resist local pressures, and thick enough to distribute these pressures so that the lower ground is not disturbed beyond its elastic limit; and the escape of water getting through the surface should be easy, though with a waterproof surface this is a secondary matter. A too rigid as well as a too soft foundation may break up the surface. If a road has to pass over steel girders or over masonry, either a greater depth of softer material must be used between the surface and the bed, or the surface itself must be stronger so as not to be broken when distorted. Theoretical aspects of this are then considered.

The various types of surface are next noted—blocks of stone, wooden blocks, asphalt, macadam, and broken stone. Here we need only concern ourselves with what the author says in regard to the adoption of tar for road making: "Of late years roads have been laid which are similar to macadam roads as regards structure, but have a surface layer with a binding material of tar compounds. Such roads appear to combine many of the advantages of asphalt with the comparative cheapness of broken stone, and though they are more expensive initially than ordinary macadam, their wear and the cost of upkeep are said to be considerably less. The large limit of elasticity which these binding materials give to the surface not only lessens the destruction of the surface by crushing, but also prevents it from becoming loose or broken; and in both these ways it greatly reduces the amount of dust which would be formed if earthy binding material took the place of the tar." Whether the tar compounds go to a depth of 2 or 3 inches, or are applied only as a spray, "the condition essential to the success of all these tarred roads seems to be that the metalling must be capable of holding the tar firmly."

As to drainage, wetness has little effect on tarred surfaces; but such effect is bad because it acts as a lubricant, and facilitates the grinding by the traffic of any loose material. Especially in the case of waterproof roads does the cross-section of the roadway play a most important part. If too flat, the road becomes flooded; if too barrel-shaped, its sides are inconveniently steep. The author believes "there is at least one practical road surveyor who considers that a road lower in the centre than at the sides would be the most suitable form. In country roads, the expense of the central drain would be prohibitive; but in towns, with a proper system of sewers, this objection does not apply. The central drain would be covered by a continuous grating, and the floor of the drain would have a moderate gradient towards the catchpits." Such a road would, at all events, keep the footpaths free from mud.

Dust and mud, Mr. Mallock says, are almost entirely due to the destruction of the road surface by iron tyres and iron-shod horses. They are the real enemies of good roads, and as they diminish in number, the general condition of the roads will improve. "In the meantime, the wear can be minimized, so far as country roads are concerned, by the use of such plastic binding material as tar compounds properly applied to the surface."

Italian Gas Company.

The annual meeting of this Company took place on the 6th inst. Increases in the sales of gas were reported, though they were not at so great a rate as was experienced the previous year. In the four towns in which the Company are interested—Turin, Bergamo, Tortona, and Girgenti—the percentage of increased output was 8, as compared with 14 for the year 1907.

Town.	Gas Sold. Cubic Metres.	Increase over 1907. Cubic Metres.	Percentage.
Turin	19,263,134	1,364,893	7·7
Bergamo	1,577,408	93,312	6·3
Tortona	427,399	45,532	12·0
Girgenti	231,993	47,180	25·5
Total	21,499,934	1,550,917	8·0

The Company are also interested in the *Società Ferrarese per l'Illuminazione a Gas*, who light Monza, Novara, Savona, Cremona, and other towns, the gas consumption in which amounted to 9,667,000 cubic metres (about 341¼ million cubic feet); being an increase of 435,000 cubic metres (15·36 million cubic feet), or 5 per cent. This is not including Ferrara, where 1,331,000 cubic metres (about 47 million cubic feet) of gas were sold; being an increased consumption of 9 per cent. The Directors and the Manager (Comm. Ing. L. Spreafico) are to be congratulated on these indications of good working and increasing demand for gas.

In the report of the proceedings on the Littlehampton Gas Bill which appeared in the "Journal" last week, it was inadvertently stated that Mr. William Cash gave evidence in support of the Bill, whereas it should have been Mr. Joseph Cash, the Engineer of the Brighton and Hove Gas Company.

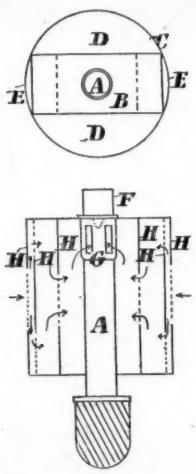
REGISTER OF PATENTS.

Inverted Gas Lamps and Burners.

HELPS, GEORGE, of Nuneaton.

No. 4415; Feb. 27, 1908.

According to this invention, the air-chamber and burner-tube are surrounded with a casing having its sides greater than its ends, and air inlets at its ends; while within the casing are baffles for preventing the direct passage of air to the burner-tube. The rectangular casing may be contained in a cylindrical casing in such a manner that the supply of air to the burner-tube cannot come into contact with the products of combustion which pass up two sides of the casing while the air enters the two ends of the cylindrical casing. Thus the rectangular casing when used inside a circular casing provides four spaces segmental in shape—two large and two small (the large spaces being used for the products of combustion and the small for the air), and so that the air on its way to the burner-tube takes up heat from the products of combustion.



Helps's Inverted Gas-Burner Casing.

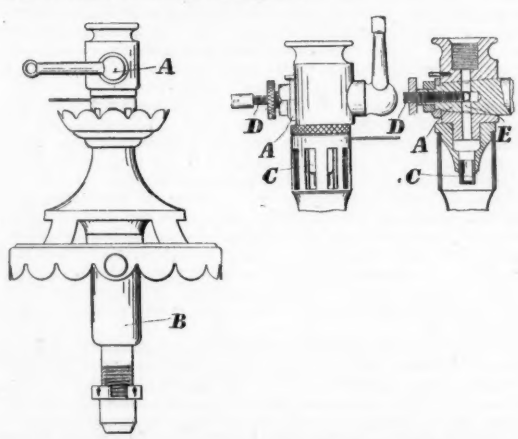
A plan of the rectangular casing inside the cylindrical casing is shown. A is the burner-tube; B, the rectangular casing surrounding it; C, the cylindrical outer casing; D, the uptakes for waste gases; E, the ends of the casing at which the air enters and which is protected from the products of combustion; F, the nipple block; G, the air-chamber of the burner-tube; and H, feathers or baffles.

Incandescent Gas-Lamps.

PROSSER, H. R., of Kings Heath, Worcester.

No. 4661; March 2, 1908.

In pursuance of this invention, the control cock is arranged in close proximity to the mixing-jet; and to provide for the regulation of the gas, a screw in the cock plug is adapted to reduce or increase the gas-passage. By providing such an adjustment in conjunction with a plug which is in close relation to the mixing-jet, it is said to be possible to regulate the supply without appreciably reducing or affecting the pressure at the mixing-jet—such an adjustment having previously been used only in conjunction with control cocks far removed from the mixing-jet. This provision of a regulable control cock in close relation to the mixing-jet has "the effect of increasing the flame within the mantle, the latter being thereby enabled to attain a high standard of incandescence, which, by virtue of the regulator, may be retained without excessive consumption of gas."



Prosser's Inverted Incandescent-Burner Regulator.

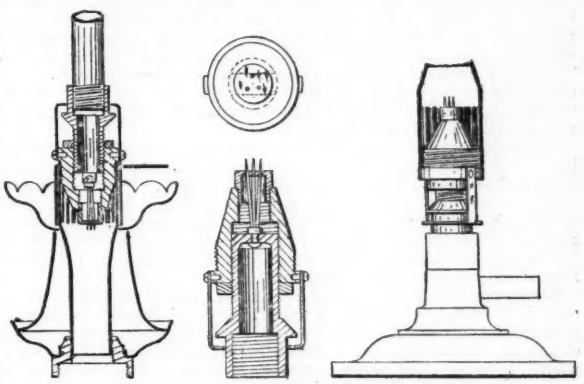
The usual bracket tap is dispensed with, and the gas supply is regulated by a tap A in conjunction with the burner B, and arranged in such close proximity to the mixing-jet C that the highest available pressure of gas is admitted to the mixing-chamber. The flame within the mantle is thus "extended in a material degree, with the result that the mantle is retained at a better heat, and thereby enabled to produce greater luminosity than is obtainable with the same amount of gas at a lower pressure." For the purpose of providing for the adjustment of the gas in its passage to the mixing-chamber, the tap A is fitted with a device by which the gas-passage in the plug may be increased or reduced in accordance with the pressure within the main. For this purpose, a screw D is provided in the reduced end of the plug, to be so adjusted as to project into the gas passage E to a greater or less degree as may be required; the main plug of the gas-tap being retained in place by a nut or washer which works in contact with the body of the burner and prevents the removal of the plug. A thumb-operable nut locks the screw in the condition of adjustment.

Incandescent Gas-Lamps and Laboratory Burners.

PROSSER, H. R., of King's Heath, Worcester.

No. 8573; April 16, 1908.

This invention relates to burners the regulation of which is effected by a plurality of taper needles which project into the apertures of the mixing-jet, and the adjustment of which in relation to the apertures is effected by the rotation of a member which encircles, or is concentric with, the supply conduit.



Prosser's Regulating Burners.

The illustrations show part of an inverted incandescent gas-lamp constructed in accordance with the invention; also as applied to a bunsen burner of the class used in laboratories; and an enlarged sectional elevation of the gas-nozzle.

The apertures within the mixing-jet are controlled by a plurality of needles provided with taper points, which, when adjusted in relation to the apertures, provide for an "effective regulation of the supply without depreciating the pressure." To provide for the adjustment of the needles in relation to the apertures, the needles are connected to a cross-piece by a swivel joint. By rotating the nozzle in relation to the nipple or supply pipe, the apertures are advanced or receded relatively to the needles, which latter are free to rotate by reason of their swivel attachment to the cross-piece, but are unable to perform any endlong movement.

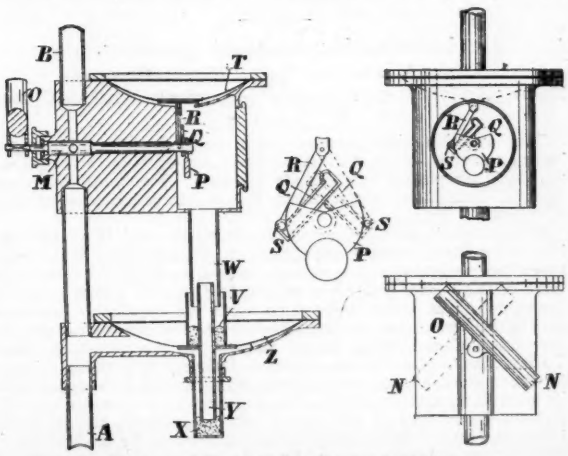
In the case of a laboratory burner it is found that, by suitable regulation of the jet, the triple-cone flame "which is known to possess the highest calorific power" is easily obtained notwithstanding the variations of pressure or number of flames.

Actuating the Controlling Cock of a Gas-Burner.

REESON, J. N., of Beckton, and BURTON, A. E., of East Ham.

No. 10,017; May 8, 1908.

This invention relates to apparatus for opening and closing the controlling cock or valve of a gas-burner through the agency of a tempo-



Reeson and Burton's Gas-Burner Controller.

rary increase in the prearranged normal pressure of the gas, and in which the gas issuing from the burner is ignited by a pilot jet. The

class of apparatus referred to is that in which the valve or cock controlling the passage of gas to the burner is operated through the agency of a bell arranged in proximity to the burner and lifted from its normal position by increase of pressure at the gas-works.

The plug M forms part of a spindle, at one end of which is attached the mechanism for operating the cock. To the spindle is fixed a slide or link motion Q, which has a channel extending from end to end. A pin S attached to one end of a connecting rod R is free to move in this channel and to locate itself at either end. The connecting rod is pin-jointed at its other end to a diaphragm or bell T, in such a manner that the motion of the latter is conveyed to the pin in the slide or link motion Q. The pin is kept in position at either end of the stroke by means of a swinging weighted pendulum P, of such design that the pin is held in position by it until the plug spindle has been turned sufficiently to either partially open or close the cock, as the case may be, after which it is released and swings to its normal vertical position—ready to engage the pin at the other end of the stroke.

The body of the pendulum is of circular form from a short distance above its centre to a longer distance below, and the lower part is suitably weighted. It is mounted on the valve-spindle, at the centre of its circular part; and the pin of the connecting rod normally rests against this circular part, just below the centre. When the pin rises, it causes the pendulum to turn with it until the pin arrives a short distance above the centre of the pendulum, when the pin will free itself from the pendulum and the latter will swing back to its normal position in readiness for another action of the pin.

On the spindle of the controlling cock plug is also fixed a lever or trigger O, in which is a moving weight N (preferably mercury), so arranged that the weight, in falling, has sufficient power to complete the opening or the closing of the cock supplying gas to the burner. This trigger or lever may be attached to the spindle either at the same end as the mechanism for moving the spindle or at the other end, in which latter case it will form a lever for operating the cock by hand if this should at any time be desirable.

The supply of gas to the operating diaphragm or bell T is controlled by a second diaphragm or bell Z (the supply diaphragm), which latter is preferably placed underneath the diaphragm T. This supply diaphragm is weighted according to the predetermined pressure at which it has been decided that the valve or cock should operate. Through it a pipe Y passes, which is fixed to the bell, and is of such a size that it is free to pass within the supply pipe W communicating with the underside of the operating diaphragm or bell T.

The upper portion of the pipe Y forms the centre part of a cup or seal V, in which (say) mercury is placed. The lower end of the internal pipe Y, when there is insufficient pressure to raise the supply diaphragm or bell Z, is sealed in a cup X placed below the diaphragm Z, by which means passage of gas to the operating diaphragm T is prevented at such time. The cup X is adjustable in height, to allow the depth of the seal to be varied as required. This may be effected by screwing it more or less into its socket and fixing it by a lock-nut.

The method of operation of the plant as described is as follows: The pressure of the gas in the main or pipe A, on being increased to a predetermined degree (to which the supply diaphragm or bell Z has been previously adjusted), lifts the diaphragm Z, raising it to such a level that the internal supply pipe Y is raised until its lower end is unsealed and connection thus made with the operating diaphragm T. At this time the lower end of the outer inlet pipe W is sealed in the cup V; and gas is therefore free to pass to the diaphragm T. The pressure of the gas acting on it raises the pin S (by the connecting rod R), which works in the slide motion or link Q, at the end of which it is kept in position by the pendulum P, which is so weighted that, the pin S assuming the position at which the valve or cock M will operate, the pendulum P is released and falls back to its normal position. The opening of the controlling valve or cock M is completed by the action of the trigger O. When the pressure is reduced and the supply diaphragm Z falls, the inner supply pipe Y is sealed at its lower end and the outer pipe W is unsealed, thereby giving free passage to the gas contained between the operating diaphragm T and the lower end of the outer pipe W.

The illustrations show the parts in the position they would occupy when the supply of gas to the burner is shut off; but when the cock M has been opened by the operations described, the parts O, Q, R, S, will assume the position shown by the dotted lines. Then, when it is desired to shut off the supply of gas to the burner, a temporary increase of pressure in the main will do so by repeating the operations, thereby returning the parts to the position shown by full lines.

Inverted Incandescent Lanterns.

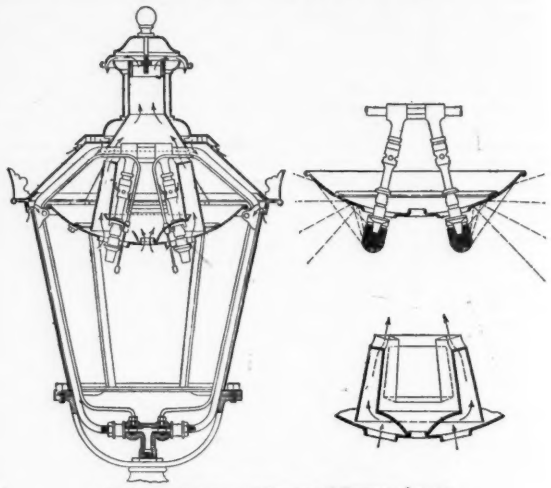
LUBER, A., and REISER, J., of Munich, Germany.

No. 12,318; June 6, 1908. Date claimed under International Convention, June 8, 1907.

This invention relates to street-lamps provided with a chimney part having a central air space in which the burner-tubes are arranged and to which air passes through side openings. The invention is also directed towards the construction of the built-in chimney and central air space.

A double-cock piece is fixed to the lamp-post, and from this pipes lead to the burner-tubes at the upper end of the lantern. The burner-tubes are preferably arranged with their axes inclined. The under parts of the burner-heads are removable from the burner; and the connection of the under part (which holds the mantle) to the upper part of the burner-tube is effected at the point where the burner-tube passes through the bottom closing piece of the inner fresh-air space. To the reflector-plate—having openings sufficient to provide an outlet for the products of combustion—is fixed an inverted cone-piece, which joins with another vertically-arranged truncated cone-piece, which forms the inner wall of the conduit for the products of combustion from the flames. The conduit is broken through by an opening, so that separate chimney parts are formed, and through the openings air passes to the central space, which forms the fresh-air space and contains the burner-tubes.

Between the inverted conical piece and the convex side of the reflector is a space which is "exceedingly favourable for facilitating the passage of the products of combustion through the chimney parts," and from the chimney parts the products of combustion pass to the central chimney, in the upper part of the lantern, and through openings above to the atmosphere. In the middle of the reflector-plate is an opening through which air can pass from the burner-space of the lantern—that is, the space below the reflector—into the fresh-air chamber. The passage of air through this opening is induced by the suction action of the waste gases escaping by the chimney.



Luber and Reiser's Inverted Burner Lamp.

The lantern is constructed so as to facilitate dismantling of the parts. Thus if the lower parts of the burner-tube are removed by unscrewing, the reflector-plate, together with the chimney conduit, can be removed in a downward direction; and in this way the gas-conduits may be readily inspected for repairs or renewals.

Lantern Supports.

GUNNING, J., of Bristol.

No. 16,979; Aug. 12, 1908.

This is a patent of addition to No. 2960 of 1908, wherein is described a construction of support for gas-lanterns having a closed box or casing provided with a door for housing the controller used for automatically turning on and off the gas at predetermined times. The present invention relates to a modification whereby it is made applicable to suspension lamps. The top of the casing, instead of being made with a plate which formed the bottom of the lantern, is provided with a boss into or on to which is screwed the swan neck for the suspension lamp.

Operating the Doors of Retorts, Coke-Ovens, and the Like.

RIES, H., of Munich, Germany.

No. 21,824; March 20, 1908.

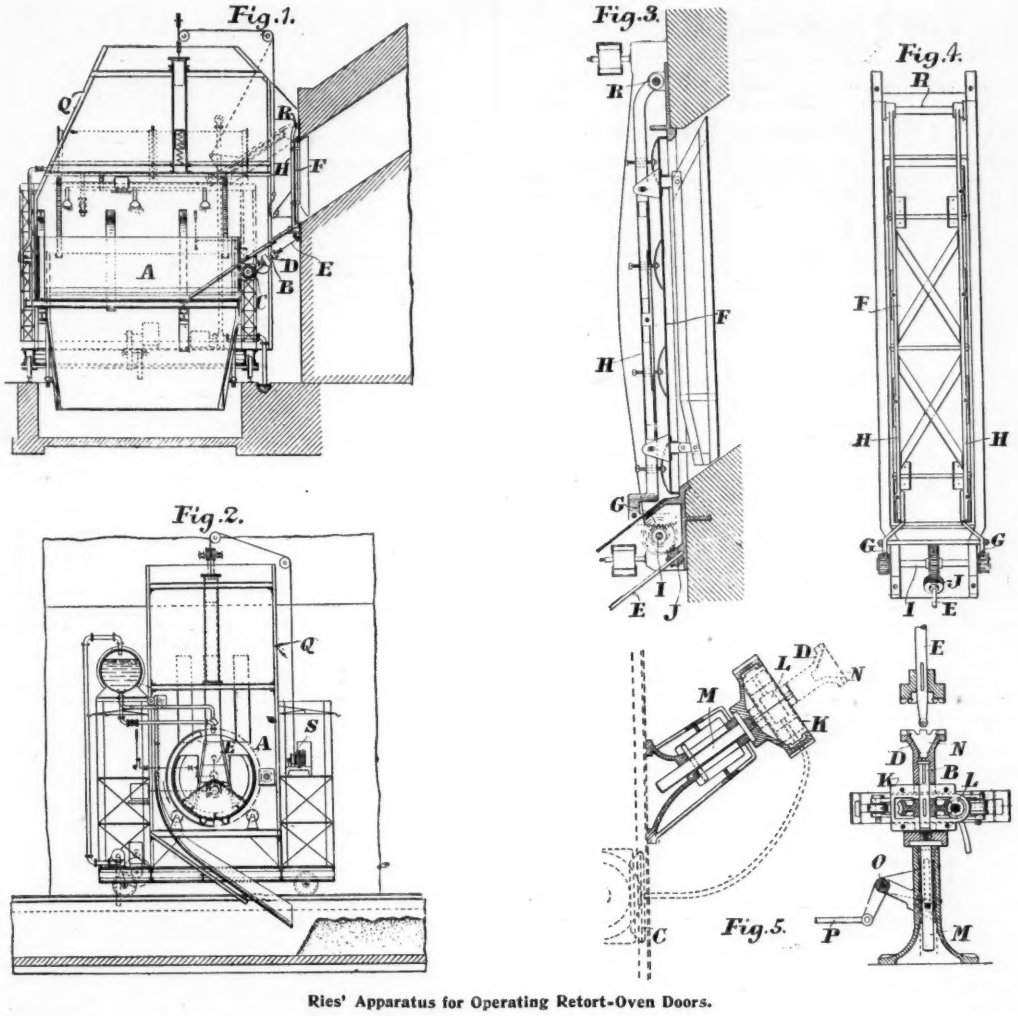
This apparatus for operating the doors of retorts and the like from a distance consists of a traveller provided with a quenching trough to be brought opposite the retort to be discharged. A rotatable shaft on the traveller has a clutch member on its free end adapted to engage a corresponding clutch member on the locking member of the retort-door; the shaft on the traveller being adjustably mounted on it, so that in the event of the two clutch members not registering it is not necessary to move the whole traveller. The door of the retort is adapted to be connected to a counterweighted cable carried by the traveller, so that once its locking mechanism has been released it can be readily swung open or closed.

Fig. 1 (p. 915) is a longitudinal section of one of a series of inclined retorts; the coke-quenching traveller, together with the door-actuating mechanism, being in position opposite it. Fig. 2 is a vertical section of fig. 1. Figs. 3 and 4 are a longitudinal section and elevation of the door-locking device. Fig. 5 shows on an enlarged scale the parts of the door-actuating mechanism carried by the traveller.

The quenching trough A (mounted on a traveller) has its longitudinal axis parallel to the length of the retort. To enable the coke to be transferred from the retort to the quenching trough when the latter has been brought into position in front of it, the door of the chamber must first be unlocked, preferably from the traveller. To this end, a spindle B, directed obliquely upwards, is mounted in a frame, and provided at its inner end with a toothed wheel C, which can be rotated by a motor, while its outer end (that facing the retort) is provided with a coupling disc or clutch D, which can be brought into or out of engagement with a corresponding clutch member on the retort-chamber, mounted on a spindle E rotatably supported below the retort on the setting or in the door frame, and connected to the locking mechanism for the door F.

This locking device comprises toothed racks G mounted on the lower ends of members carrying the door, and pinions mounted on both ends of a shaft I engaging these racks. The shaft is rotated by a worm wheel keyed on its centre and engaging with a worm J, mounted on the free end of the spindle E. By moving the toothed racks G by means of the pinions, the door can, therefore, be firmly pressed against its supporting surface on the retort; while when the racks are released, it can be swung upwards.

As will be seen from fig. 5, the spindle B is mounted on a sliding carriage K, which can travel by means of rollers in a frame in the



Ries' Apparatus for Operating Retort-Oven Doors.

direction of the traveller, but is always brought back into its central position by means of tension springs secured to the frame and to the casing of the sliding carriage. In the casing of the carriage K (which is preferably made in two parts) is mounted, on the spindle B, a worm wheel with which engages a worm L journalled in the sliding carriage, the spindle of which projects through a slot in the frame and can be coupled to a flexible shaft from the motor. The frame is mounted on a rod M attached to it and adjustably mounted in a bracket secured to the frame,

The proper alignment of the spindles is obtained by providing the clutch member D with a conical cup N, the apex of which is remote from the jaws of the clutch, while the free end of the spindle E (which is rigidly mounted) projects beyond the jaws of its clutch member to an extent corresponding to the depth of the conical recess N. The outer end of this rod is preferably provided with an anti-friction roller.

The operation of the clutch is effected by a longitudinal movement of the rod M in its bracket. To this end, the bracket is provided with two small brackets in which is journalled the spindle O of a bifurcated lever, which forms one arm of a bell crank lever. The two arms of the lever are provided at their ends with slots, which guide sliding blocks in which is mounted a pin passing through the rod M. To the lever is pivoted a rod P, which can be operated from the driver's seat on the traveller, and when actuated the bell-crank lever is moved, and the rod M, together with the clutch disc D, is therefore shifted in or out of the bracket.

When the frame is not in its exact position in front of a retort, the roller on the rod E, when the rod B is thrown into gear by the link P, strikes the conical surface of the clutch member D, and so moves the sliding carriage K within its frame and automatically effects correct alignment of the two rods. The coupling jaws are then made to engage by the switching in of the motor, whereupon (according to the direction of rotation of the motor) the door F can be released or locked. On the clutch being disconnected, the sliding carriage is automatically brought back to its central position by the action of the springs.

Complete opening and closing of the door F from a distance is effected (after its releasing mechanism has been actuated) by the mechanism hereafter described. In the upper portion of the flue Q through which the fumes generated during the quenching of the coke are discharged is arranged a balance-weight, which may be detachably connected to the door by a chain or cable passing over guide pulleys. The door which is rotatably mounted on a pin R above the retort is provided with a bracket with which a hook secured to the cable can be brought into engagement. The balance-weight is connected by a cable or chain passing over guide pulleys to a winch S mounted, together with its driving motor, with the frame. After the door has been released, the balance-weight comes into operation and opens the retort by raising its door into the position shown by dotted lines.

APPLICATIONS FOR LETTERS PATENT.

6110.—YARROW, M., "Pipes, retorts, and the like." March 15.

6159.—HORTON, J. & W., "Gas-engines." March 15.

6181.—JARRETT, J. A., "Manufacture of gas." A communication from Anton Graf. March 15.

6196.—HARROP, G., and SOPER, J. P. H., "Mantles." March 16.

6214.—SWANN, H. P., "Automatic shut-off appliance for gas-rings and stoves." March 16.

6218.—BEDELL, B. H., and HIRD, M., "Automatic gas-igniter or bye-pass valve for incandescent burners." March 16.

6230.—JAMES, G., "Realizing the full calorific value of hard fuel." March 16.

6263.—POOLE, W. W., and MANCCK, E., "Gas-regulator." March 16.

6293.—REDEN, U. VON, "Pressure or vacuum meter." March 16.

6320.—LYON, J. H., "Prevention of choked ascension-pipes." March 17.

6347.—GATRIX, S., JUN., and BROTHER, LTD., and HARRISON, A., "Gas-fittings." March 17.

6411.—JONES, J. G., "Process of purifying and revivifying spent or waste lime." March 17.

6421.—SEFTON-JONES, H., "Gas-heated iron." A communication from C. F. Capell and R. N. Pearson. March 17.

6433.—WALKER, G. A., "Inverted burners." March 17.

6449.—WILSON, A., "Working of vertical coal-gas retorts." March 18.

6493.—MORGAN, J. H., "Clips for pipes." March 18.

6515.—SCHMIDT, F., "Purification of gases." March 18.

6542.—WELSBACH INCANDESCENT GASLIGHT COMPANY, LTD., and RULER, W., "Incandescent burners." March 18.

6543.—OGDEN, J. E. L., "Stop-valves." March 18.

6553.—IONIDES, A. C., JUN., "Machine gas-making apparatus." March 18.

6556.—MULLER, J. L., and BONNET, J., "Mantles." March 18.

6557.—KIRKHAM, HULETT, AND CHANDLER, LTD., and BLAKE, E. W., "Cooling and condensing gases." March 18.

6563.—FOSTER, H. A., and JACKSON, C., "Bye-passes for incandescent burners." March 18.

6588.—FISK, J. W., "Inverted burners." March 19.

6601.—GELLER, F., "Electric light or gas illuminating frame." March 19.

6611.—MULLETT, G. C. A., "Water-meters." March 19.

6639 40.—PITT-PAYNE, W., "Gas-fires." March 19.

6654.—CAMERON, J. W., "Chimneys or lamps for incandescent gas lighting." March 19.

6686.—REARDON, T. J., "Securing gas-pendant blocks." March 20.

6700.—OULTON, J., and NEWHOUSE, W. A., "Anti-vibration burner." March 20.

CORRESPONDENCE.

[*We are not responsible for opinions expressed by Correspondents.*]

Mr. Lee's Yorkshire Junior Association Paper.

SIR,—As to your report of my address before the Yorkshire Juniors, on Saturday last, you wrongly designate me "Chief Chemist." I have the honour to have as my Chief, Mr. J. T. Sheard, whose name is better known than mine.

Please note, too, that the weight of oil taken for the estimation of naphthalene (p. 853, par. 7) should be 14·6 grains, and the result given in grains. Also in the estimation of moisture in sulphate of ammonia 100 grains are taken, not grammes, as given in the details of an analysis on p. 854.

Neepsend Gas-Works, Sheffield, March 24, 1909. JOHN W. LEE.

Working of Horizontal Chamber-Ovens at Rotterdam.

SIR,—Through pressure of work and frequent journeys abroad, I have only quite recently seen the letter on the "Working of Horizontal Chamber-Ovens at Rotterdam," in your issue of Feb. 16.

To the remarks then published I have to say that the trials of which mention is made in Mr. Kopper's letter, were carried out by the authorities of the gas-works at Rotterdam themselves. The same critical remarks of the Koppers Company have now been published in the Dutch and Austrian gas papers; but on my inquiry, Mr. Sissingh, the Manager of the Rotterdam Gas-Works, declines to act, as the trial results had, he says, been ascertained under all necessary supervision and care, and are absolutely above-board. The tests were all the more independent and reliable because the trial-oven was working quite by itself in a special installation having a daily capacity of some 3000 cubic metres. It is clear, therefore, the authorities at the Rotterdam Gas-Works were in a position to ascertain to a nicety the results obtained in point of production of gas, coke, tar, and bye-products.

Now every practical man in the gas profession knows (or ought to know) that laboratory trials can in no wise compare with actual work on a commercial basis. Not knowing the methods employed by the Koppers Company in their laboratory work, it is, of course, not possible to give an opinion on their figures—all the more, since they do not say by which calorimeter they ascertained the calorific values. But this much is certain—that in Germany, at all events, nobody would be satisfied with results such as the Koppers Company ascertained with Hugo coal. The Hugo people themselves write to say that their coal gives up to 32 8 cubic metres of gas per 100 kilos. of coal.

It is generally acknowledged that chamber-furnaces produce more gas per unit than retort-furnaces. The Munich Gas-Works state that their chamber-furnaces produce up to 37 cubic metres of gas out of 100 kilos. of coal carbonized. At Königsberg, we built a bench of chamber-furnaces, and the trials, which have now come to an end, show results quite equal to those obtained at Rotterdam. At Königsberg, Leverson coal is being carbonized. It gave 33·7 cubic metres of gas per 100 kilos. Also the calorific values corresponded with those ascertained at Rotterdam. At Königsberg, too, the values were ascertained in the most careful manner by the experts at the gas-works themselves; and the results confirm, particularly, all the figures given by Mr. Sissingh.

Dortmund, March 20, 1909. pro AUG. KLÖNNE,
Otto Benninghoff.

Fires Caused by Gas and Electricity Last Year.

The annual report of the London Fire Brigade issued last week, containing a record of the fires which occurred in the twelve months ended Dec. 31 last, shows that, of the total of 3238 fires dealt with in this period, 357 were directly attributable to gas lighting and heating, against 101 having their origin in electric lighting, &c. The details of the fires caused by gas were as follows: Escapes, 108; curtains, &c., coming into contact with gas-light, 84; portable gas-stoves, 23; overheating of gas-stoves, 22; swinging gas-brackets, 22; gas-stoves, 20; seeking with light for gas escape, 15; overheating of gas-light, 14; curtains, &c., coming into contact with gas-stove, 11; gas-fitters at work, 8; clothes coming into contact with gas-stove, 7; goods coming into contact with gas-light, 6; overheating of gas-engine, 4; gas-light, 4; gas-ring, 2; gas-lighting, 2; portable gas-copper, 1; gas-lamp, 1; spirit coming into contact with gas-light, 1. Of the fires in connection with electric lighting, &c., 91 were caused by defective circuit; the remainder being the result of an electric light or a spark coming into contact with celluloid goods, mineral oil, or spirit vapour, defective electric wires, short-circuit, &c. There were four fires at gas-works, but none of them were serious. Two of the outbreaks were caused by lights being thrown down, one by an escape of gas, and one by a spark from a workman's tool. There was one fire at an incandescent mantle dealer's, caused by an overheated metal coming in contact with solution. There were seven fires at electric light works, caused in each case by defective circuits, and nine outbreaks of fires on electric tramcars on the road—all having a similar origin. There were also seven fires at the establishments of electrical engineers—six being caused by defective circuits, and one by defective wires. A comparison of these figures leads to the conclusion that, considering the infinitely greater number of houses in which gas is used as compared with electricity, and bearing in mind the fact that it is almost wholly employed by the poorer classes, who are proverbially the most careless, the claim that electricity is a safer lighting agent than gas is scarcely substantiated.

Bexhill Water and Gas Company.—At the meeting of the Company last Thursday, the accounts presented showed that the revenue in the six months ending the 31st of December was £10,544, and the expenditure £5837; leaving a balance of £4707 to go to the profit and loss account. The amount available for distribution was £5607; and the Directors recommended dividends for the half year at the rates of £7 and £4 18s. per cent. per annum on the two classes of capital.

PARLIAMENTARY INTELLIGENCE.

HOUSE OF LORDS.

The following further progress has been made with Bills:—

Bill brought from the Commons, read the first time, and referred to the Examiners: Leyland and Farington Gas Bill.

Bills reported: Clevedon Water Bill, Heckmondwike and Liversedge Gas Bill, South Lincolnshire Water Bill.

The Risca Urban District Council Bill and the Wakefield Corporation Bill have been referred to a Select Committee, consisting of Lord Kilmarnock (Chairman), the Earl of Camperdown, Lord Abinger, Lord Kenyon, and Lord MacDonnell; to meet to-day.

HOUSE OF COMMONS.

Tuesday, March 23.

INTERFERENCE WITH NATURAL WATER SUPPLIES.

On the motion for the second reading of the Glamorgan Water Board Bill,

Mr. BARNARD said it would be within the recollection of the House that about a fortnight ago, during a discussion, whole-hearted sympathy was expressed with a certain instruction which, practically speaking, was to see that no Bill passed the House dealing with the water question either of a company or of a municipality, unless there were clauses safeguarding the interests of the agricultural community of the place whence the water supply was likely to be drawn. The motive and the principles were well understood and approved. At present it was incumbent on persons who thought they would be injured, to come before the Parliamentary Committees to have their views argued as to how a Bill was likely to affect them, and then, after being put to enormous expense, they only discovered in an extremely shadowy way what their position was. He wanted to come to some arrangement by means of which there could be some finality to all this. He wanted to secure a Model Clause which would prevent small people continually having to come to repeat the same tale before Parliamentary Committees, and, after having spent their money and urged their case, to leave it so that someone else in a similar position had to do exactly the same thing the year after and in successive years. He did not think that anyone would disagree if a form of words could be found which would give expression to this opinion, and safeguard these people. The Chairman of the Central Chamber of Agriculture, the honourable member for Rye (Mr. Courthope) was responsible for the first instruction which had been put on the paper, but that hardly met the case. His (Mr. Barnard's) instruction would not hurt the promoters; and if it subsequently transpired that an individual was injured, everyone would agree that if water was taken away from a locality the persons who had the advantage of it ought to recompense the loser. They wanted a simple form of words to give real effect to the position. The previous instruction did not give effect to what was intended and what they all desired, and therefore, unless some understanding was arrived at, he should move his own. He was happy to be able to say that since he had put it on the paper he had been approached by the promoters of the respective Bills, who were willing to accept it. He had also obtained from the promoters an undertaking that if the Chamber of Agriculture presented a late petition against the Bill, to endeavour to secure the insertion of a clause on the lines indicated in his notice, they would not object to the Standing Orders being dispensed with in respect of such petition. The promoters recognized the justice of the idea which the Central Chamber of Agriculture put forward. Under the circumstances, he was not disposed to go any farther in this matter if the President of the Local Government Board would say he approved of the settlement, which was quite on the lines he had set himself to establish on a previous occasion.

The Bill was then read a second time.

The instruction referred to by Mr. Barnard was as follows: "That it be an instruction to the Committee on the Bill to inquire whether the effect of the exercise of the powers sought by the Bill will or may be to produce, within a period of ten years from the date of completion of the works described in, and proposed to be authorized by, the Bill, the failure or material diminution of any source of water supply of which, at the passing into law of the Bill, any persons lawfully avail themselves, and whether the provisions of the Bill are such as to afford adequate and equitable protection or compensation to such persons in respect of such failure or diminution. That if, in the opinion of the Committee, such failure or diminution will or may, within the said period, be produced, and the provisions of the Bill are insufficient to afford such protection or compensation as aforesaid, the Committee be empowered to insert a clause or clauses providing (*a*) that the local authority for any district in which any such source of supply as aforesaid is situate shall be at liberty, in the event of any failure or diminution in such source of supply being produced within the said period, to make representations on the matter to the Local Government Board; (*b*) that if it should appear to the Local Government Board, upon any such representation, that the alleged failure or diminution may have been produced by the construction or use of the said works, the Local Government Board shall communicate their opinion to the undertakers, who may then enter into an agreement with the local authority for a supply to them of water in bulk; (*c*) that, in default of such an agreement being entered into within a period to be specified in the Bill, the Local Government Board shall hold a local inquiry; (*d*) that if, as a result of such local inquiry, the Local Government Board are satisfied that the failure or diminution of supply is due to the construction and use of the said works, the Board may make an order directing the undertakers to afford to the local authority a supply of water in bulk from the mains or works of the undertakers, upon such terms and conditions as to payment and otherwise as may be agreed

upon between the undertakers and the local authority, or as, failing such agreement, may be determined by the Local Government Board to be fair and reasonable having regard to all the circumstances of the case; (*e*) that any order so made by the Local Government Board may be enforced by *mandamus;* and (*f*) that the cost of the local inquiry shall be borne in such manner as the Local Government Board may direct.

Mr. BURNS (the President of the Local Government Board) took exception to the instruction; and the debate was adjourned.

Wednesday, March 24.

To-day, on the motion of Mr. PRETYMAN, it was ordered—"That it be an instruction to the Committee that they have power to inquire whether the promoters have made adequate provision by the Bill for the supply of water at reasonable rates to the agricultural community within the area of supply, and to any person or persons from whom any existing or natural supply is, or may be, withdrawn owing to the works or undertakings authorized by the Bill; and that they further have power to insert in the Bill such clause or clauses as they think necessary to impose upon the promoters the obligation to provide such supply."

A similar instruction was ordered in respect of the Oldham Corporation Bill and the Aldershot Gas and Water Bill.

The following further progress has been made with Bills:—

Bills read a second time and committed: Aldershot Gas and Water Bill, Glamorgan Water Board Bill, Oldham Corporation Bill.

Bill reported: Mountain Ash Urban District Council Bill.

Bill read the third time and passed: Leyland and Farington Gas Bill.

The consideration of the Aldershot Gas and Water Bill and the Yorktown and Blackwater Gas (Electric Lighting, &c.) Bill has been adjourned until the 21st prox.

THE GASLIGHT AND COKE COMPANY'S BILL.

House of Commons Committee.—Thursday, March 25.

(*Before Mr.* J. J. MOONEY, *Chairman, Mr.* CARLILE, *Mr.* J. TAYLOR, *and Mr.* ALFRED KING.)

This was a Bill to authorize the acquisition by the Gaslight and Coke Company of the undertaking of the West Ham Gas Company; to confer further powers on the Gaslight and Coke Company; and for other purposes.

Mr. BALFOUR BROWNE, K.C., Mr. DANCKWERTS, K.C., Mr. HONORATUS LLOYD, K.C., Mr. NEVILLE, and Mr. DAVIDSON (Messrs. Dyson and Co., Parliamentary Agents), appeared for the promoters. The following petitions against the Bill were read—Counsel "reserved" indicating little or no opposition: Wanstead Urban District Council, reserved; Leyton Urban District Council, reserved; West Ham Corporation, Mr. FREEMAN, K.C., and Mr. MORTEN; London County Council, reserved; Ilford Gas Company, Mr. L. COWARD, K.C.; East Ham Corporation, Mr. HUTCHINSON; Corporation of London, reserved; West Ham Gas Company (against alteration), Mr. FORBES LANKESTER.

The CHAIRMAN, at the outset of the proceedings, announced that one of the members of the Committee wished to make a statement in regard to his interest in the Gaslight and Coke Company.

Mr. CARLILE said he need not mention the amount of his interest; but he was a shareholder in the Gaslight and Coke Company.

Mr. COWARD remarked that it was an undertaking of such magnitude that the point need not be considered.

Mr. BALFOUR BROWNE, in opening, confessed that at one time he thought the consideration of the Bill would be a formidable matter; but now it had dwindled down. He need not go into the history of this great Corporation, which was the result of a number of amalgamations similar to the small one now before the Committee. No fewer than seven separate undertakings had been merged in the Gaslight and Coke Company. The amalgamated Company now supplied over an area of 62 square miles, and during 1908 they sold 21,946 million cubic feet of gas, and also 962,166 tons of coke and breeze. The total capital of the Company at present was £25,885,385. The objects of the Bill were very simple. First, it was to absorb the West Ham Gas Company. It was also to reduce the standard price of gas from 3s. 4d. to 3s. 3d. This reduction was in consequence of a bargain they made with the London County Council some time ago, and which the Company were now carrying out. At one time, the Company did not charge anything for meter-rents; but the time came when they thought it would be necessary to re-impose them. They, however, bargained with the County Council that if and when they did have to resort to meter-rents, they would reduce the standard price of gas by 1d.; and therefore their standard price, which was to-day 3s. 4d., had, in consequence of that bargain, to be reduced to 3s. 3d. The Bill provided that not one penny advantage went to the stockholders in consequence of the re-imposition of the meter-rents. It was merely carrying out a bargain; and the County Council were content. The standard dividend was to be regulated on the half year, instead of on the year; and they also proposed a reduction of the illuminating power from 16 to 14 candles. The Gaslight and Coke Company's district was very fully occupied and built upon. The only part in which they could see any possible extension was in the north-west, where there was still a possibility of extension, although Willesden was being rapidly built over. On the north, their district was hemmed in by a number of suburban companies; and there was no possibility of expansion in that direction. It was the outside area of the Metropolis in which expansion was taking place, and in which the population was increasing. They had at their works at the present time a considerable margin of plant; and a great portion of this was not doing any work at all. The West Ham Company had a large and rapidly-growing district. In 1902, they were in Parliament and sought power, in order to meet the requirements of their district, to build new works; and they purchased land in East Ham for the purpose of erecting large works there. They had already constructed a gasholder; and in the immediate future they would have to spend something like £250,000, which, of course, in their hands, would be unremunerative for a considerable period. They would also soon have to contemplate larger works and the expenditure of a great amount of capital; while the Gaslight and Coke Company had the disposable capital ready for the supply of the district. The West Ham Company had now only a margin of a million cubic feet, or about 13 per cent.; and as some of their retorts were not in good order, the margin was reduced to about 10 per cent. It was calculated that the productive power of the West Ham works would only last for the expansion of the district for two years. Everybody agreed there ought to be an extension of works at once if they were to meet the wants of the immediate future. There was now at the Bromley station of the Gaslight Company in West Ham surplus retort-house power to the extent of 7 million cubic feet a day; and there was also surplus power at the Beckton works of the Company equal to the production of 10 million cubic feet per day. The terms of purchase had been approved by the shareholders of both Companies. For every £100 of West Ham ordinary stock, £121 of ordinary stock of the Gaslight and Coke Company had to be given; for every £100 of West Ham 5 per cent. preference stock, £125 of Gaslight and Coke Company's 4 per cent. preference stock, which was an exact exchange; and for every £100 of West Ham 4 per cent. debenture stock, £133 6s. 8d. of Gaslight and Coke Company's 3 per cent. debenture stock. The real benefit they would get would be that they would be saved any large expenditure in the near future. He thought the effect on the consumers, on the present basis, was that it might result in an increased cost per 1000 cubic feet of 0·02d. They cancelled all the unissued capital of the West Ham Company. The testing in the district would be as before. There was compensation to the Directors of the West Ham Company on the basis given by Parliament in the case of the Water Companies' Directors; and also compensation to officers. Clause 30 of the Bill, dealing with the reduction of standard price, was an important one, because it was in connection with this that there had been read out the fact that two of their most important opponents—the London County Council and the Corporation of London—had reserved Counsel. Negotiations had taken place, and were taking place, between the County Council and themselves—the Council, of course, watching the interests of the gas consumers. The negotiations had gone so far that he might say they had agreed to a still further reduction of the standard price. The agreement was not absolutely written out and signed, sealed, and delivered. But they were at one in the agreement come to; and that was why the County Council were not appearing. They were going to reduce their illuminating power from 16 to 14 candles; and the County Council naturally said: "If you are going to reduce the illuminating power, it will cost you less to manufacture gas." The Company took the view that the real saving on this would be very small indeed. In a large number of cases the illuminating power of gas was reduced. Making 16-candle gas was waste. The Company's view was that the utmost saving they could make by the reduction of two candles would be about ½d.; but the compromise had gone further, and they had agreed with the Council to reduce the standard price by another penny. Therefore it might be taken that they were prepared, as part of the settlement with the London County Council, to insert in the clause a standard price of 3s. 2d. instead of 3s. 3d. With regard to the meter-rents, the total gain of the Company was £60,000 a year; but the loss by giving up the penny was something like £80,000 a year. Counsel next proceeded to deal with the petitions. As to the East Ham Corporation, he believed they felt they were put under certain obligations when the West Ham Gas Company got power to take a site, and they thought they should be relieved of these obligations. He believed certain negotiations had gone on, and that there was every chance of their coming to some compromise with regard to this matter. Everyone of the big Companies in London had reduced their illuminating power; and the West Ham Company reduced theirs in 1902. As to the Ilford Gas Company, they must be wanting to get rid of money here, for they were not touched at all. They were entirely outside the West Ham area. The Gaslight Company had put in a clause with regard to the Barking Gas Company. Their existing history was cheek by jowl with the Barking Company; but they had put in a clause showing that nothing would affect their area at all. They offered the Ilford Company the same clause; but still they were here—he could not understand why. The proceedings on this Bill would have been of a more formidable character had so much opposition to it not already been withdrawn.

Mr. *Corbet Woodall*, the Governor of the Gaslight and Coke Company, gave evidence in support of Counsel's statement, and recapitulated many of the details. He stated that their total converted capital employed was £27,472,192. The chief object of the Bill was the absorption of the West Ham Company. The Gaslight and Coke Company's district, enormous as was its extent, was essentially urban, and, except for a comparatively small area to the North of London, was closely built over. The Company were so confined that they barely crossed the border of the metropolitan area. A large number of suburban gas companies had been formed, and had obtained statutory powers, till they ringed the Company's area round, and there was some danger of their being stifled. Great as had been the growth of London within recent years, its expansion had been largely into the suburbs, and therefore away from the Company's limits of supply. While the rate of progress of the Company was slow, they had been remodelling their plant and introducing improvements which had largely added to the producing capacity of their works. Though the Company had discontinued the manufacture of gas at several stations, they had still a margin of plant much in excess of what was needed for safe working. This idle plant was at present earning nothing; and the Company were anxious to find it occupation. They directed their attention to the suburban gas companies nearest to their eastern stations at Bromley and Beckton, where they had the largest surplus of plant. West Ham was the largest of these. Witness then described the grounds on which the Gaslight Company asked Parliament to authorize the absorption of the West Ham Company upon the terms agreed. The Company

had a manufacturing capacity of 9,150,000 cubic feet a day; and the output recently reached the figure of 8,499,000 feet, or, on the average of the three heaviest consecutive days, 8,091,000 feet. So that there was a nominal margin of a million cubic feet, or about 13 per cent., reduced to about 10 per cent. by some of the retorts not being in good order. The West Ham increases during the last few years had been as follows: 1905, 8·2 per cent.; 1906, 11·3 per cent.; 1907, 10·7 per cent.; 1908, 4·17 per cent. Assuming the rate of increase at the figure of 7 per cent., the productive power of the West Ham works would have been overtaken in less than two years. Witness explained the need of a reserve of producing power, and said it had been proposed by the West Ham Company to expend £250,000 in extensions of plant on the East Ham site. By the amalgamation now proposed, this expenditure would be saved. There was no doubt as to the ability of the Gaslight Company to take up at their Bromley and Beckton stations alone their own increases and those of West Ham for an indefinite period of time. The effects would be to retain any increase in rateable value and to lessen unemployment. With regard to the preference and debenture stocks, they were precisely equivalent as regarded annual income obtained by the holders of West Ham stocks; and as to the ordinary stock, the West Ham standard price was 2s. 11d., whereas the Gaslight Company's present standard was 3s. 3d., allowing for the 1d. reduction in the standard price effected under the agreement with the London County Council in 1907 on account of the re-imposition of meter-rents. The Gaslight Company's standard rate of dividend was only 4 per cent.; whereas the West Ham Company's standard was 5 per cent. The consumers of gas in the Metropolis or West Ham might be regarded as unaffected by the alteration in the standard price. As to testing, it was proposed to continue the present mode, and also the apparatus as now used for testing in the West Ham Company's district. It was not proposed in practice to alter the present arrangement as to testing time. The Gaslight and Coke Company objected to the testing of the gas at half-hourly intervals. All they wanted was to get a fair test to show the real illuminating power of the gas. Two more testing-stations were asked for, to be provided and maintained by the Company. But he regarded these as unnecessary; and they would be a great expense. The standard price, as part of the arrangement with the County Council, was now to be reduced to 3s. 2d. It was proposed by clause 34 to reduce the standard illuminating power from 16 to 14 candles; and this had already been done in all other parts of the Metropolis—South Metropolitan, Commercial, West Ham, and Tottenham Companies.

Mr. BALFOUR BROWNE: There is a statement referred to in the petition of the County Council which says that in nearly every case Parliament has imposed a substantial reduction of the price when the illuminating power is reduced. I want it to be put on record that this is not quite accurate.

Witness: It is not quite accurate.

At the time reductions were made in the Metropolis, had the question of the value of a candle been thoroughly gone into?—No, we used to reckon the value of a candle at a penny in days when gas was enriched by cannel coal.

When the South Metropolitan Gas Company reduced their illuminating power to 14 candles, the obligation of the Gaslight and Coke Company to charge the same price as the South Metropolitan Company south of the river ceased to be binding?—It did.

Before that you had been bound?—Yes.

Witness went on to say that the Gaslight Company had undertaken that if they reduced their illuminating power to 14 candles, they would not charge on the south of the Thames more than the South Metropolitan Company charged for gas of the same illuminating power. The Company were prepared to give an assurance that their charge for public lighting on either side of the river should not exceed the price per 1000 cubic feet for the time being charged by the South Metropolitan Company for private lighting when the illuminating power of both Companies was 14 candles. [Clause 34*a* in the Bill was as follows: "The Gaslight Company shall not charge in any part of the Gaslight district south of the River Thames a higher price per 1000 cubic feet of 14-candle gas, either for public or private lighting, than the price for the time being charged by the South Metropolitan Gas Company for gas of the same illuminating power."] Witness briefly explained the clauses dealing with the period of error in defective meters, and the co-partnership scheme.

Replying to Mr. FREEMAN, witness said the probabilities of advantages to the consumers of gas in West Ham were greater in the matter of a reduction in price by the Gaslight Company than by the West Ham Company, because the present works of the West Ham Company were full up. He estimated the probable expenditure upon the construction of works at East Ham would be about a quarter-of-a-million. He had not formed any estimate of what the probable increase in the price of gas would be supposing they had to build these works.

Mr. FREEMAN: Let us take the other side of the question. At the present time your standard price is, by agreement with the County Council, 3s. 2d.?

Witness: At present it is 3s. 3d.; but if the Bill is passed, it will be 3s. 2d.

What is the corresponding standard price of the West Ham Company?—Their standard price is 2s. 11d.

What is the actual price now being charged by the Gaslight and Coke Company?—2s. 9d.

And what is the price actually charged by the West Ham Company?—2s. 8d. But the West Ham Company are supplying 14-candle gas, while the Gaslight Company are still supplying 16-candle gas.

At the present time there is a difference in favour of West Ham of 1d.?—Yes, with that correction.

The present works at West Ham employ a considerable number of hands?—Yes.

It is obvious it would be a matter of some importance, both from the point of view of finding employment for persons and the rateable value of the borough, if the works were closed?—Yes.

Is it your intention to close these works?—No.

Would you have any objection to saying you should not close these works?—I should have a strong objection. I have no business whatever to pledge the future as to what it would be wise to do.

Supposing you closed these works and did not transfer the men to some other place, you would increase the number of the unemployed, who have already great difficulty in that part?—Whether the work is carried on at East Ham or the Gaslight Company's works at Bromley, it would not affect them.

You absolutely decline to come under any terms that you should keep the works open?—I must decline absolutely to keep them open indefinitely.

Continuing, witness said he would not accept any limitation of the number of men. He would be prepared to keep people in the West Ham works for a period of ten years as they were at present. The West Ham Corporation ought to accept the Company's assurance that it was not their intention to close the works, and that they would keep them open for ten years. They would keep them open to work at a profit.

Mr. COWARD, on behalf of the Ilford Gas Company, said by clause 16 of the Bill they were seeking to exercise within the West Ham district all powers, rights, and privileges of a gas company?

Witness: Yes.

Clause 3 says: "The expression 'the West Ham district' means the limits of supply of 'the West Ham Gas Company's Act, 1856,' as defined in section 12 of that Act." The words "and the suburbs and vicinities thereof, and parts adjacent," were of a very indefinite character?—That is so.

This is almost obsolete gas legislation?—Yes.

You have provided that you shall not supply my district. Do you intend to do anything else in my district? You know that, under the general law, this West Ham district now would be within the limits of your Special Act?—Yes.

And you could come through my district under the Gas-Works Clauses Act, and lay your mains to get to another district adjacent?—If that is so, we will give an undertaking not to do it without your consent.

Do you know that in the Gaslight Company's Act of 1868 you may not only lay your own mains through the district, but you may interfere with my mains already laid there. Nowhere in the Bill do you meet me there?—If there is any such power in the hands of the Gaslight Company, we will give you full protection.

You have perfectly met us as regards supply; but I say you have not met us under the general law, and under the strong powers you have?—What I have said is this—that we will agree to such a clause as will prevent the Gaslight and Coke Company not only from any invasion for the purposes of supply, but of laying down mains.

The third clause contains the words: "The undertaking of the West Ham Company includes all rights of making, distributing, and supplying gas, and all other the rights, powers, authorities, and privileges whatsoever, and whether statutory or not, of the West Ham Company." Have you any objection to saying with regard to the undertaking which you are taking over that these privileges and rights, "whether statutory or not," of the West Ham Company, are to be subject to the provisions of this Act, because if you say that I will go away?—Surely they are subject to the provisions of the Act.

I hope they are; and that is what I want you to make quite clear?—I read this as simply meaning that if there have been agreements entered into between the Corporation of West Ham or any other local authority and the Gaslight and Coke Company, although they are not statutory agreements, we take them over; and any privileges which are granted by them become the privileges of the Gaslight and Coke Company, just as they were of the West Ham Company.

I do not see any objection to the words; and if you say they are to be subject to the provisions of the Act, I have no objection all. I want to know if you have any objection to making them subject to the provisions of the Act?—I say that they must be subject to the provisions of the Act?

Then I will ask the Committee to make them subject to the provisions of the Act.

Mr. HUTCHINSON: Is it the intention of the West Ham Company to construct certain works in the district of the East Ham Corporation?

Witness: It is.

And you are aware that the East Ham Corporation have come under obligations to construct certain roads which they have constructed, and a certain bridge, &c.?—Yes; but I do not think the bridge is constructed.

Whether you use this site or not, I understand that you are not unwilling to put yourselves generally in the position that the interests of the East Ham Corporation, so far as the obligations they have undertaken are concerned, shall not suffer?—Yes.

In re-examination by Mr. HONORATUS LLOYD, witness said that with regard to the Ilford Company, apparently the two Companies to-day had concurrent rights over the area. The West Ham Company apparently had no right to supply gas without the consent of the Ilford Company. This would appear to leave the West Ham Company at liberty to lay mains throughout the Ilford district without the consent of the Ilford Company. He was, however, willing to say that, without the consent of the Ilford Company, they would neither supply gas nor lay mains.

Mr. HONORATUS LLOYD: Does that seem to you to fairly get over any difficulty that they have?

Witness: Yes; it appears to be surrendering a right held by the West Ham Company. But it is one I do not want to force against the Ilford Company.

Mr. COWARD: Do I understand that you still wish to retain the limits as defined in the old Act?

Mr. HONORATUS LLOYD: Yes, we still wish to retain those limits; but we are quite willing to say that, without their consent, we shall neither supply gas nor lay mains.

Witness: As I understand it, this question of limits affects not simply the Ilford Company, but many others, who may not look at it from the same point of view as Ilford does.

Mr. HONORATUS LLOYD: The Ilford Company are properly interested in their own district; and, as far as that is concerned, we are willing to say we will neither supply gas nor lay mains without their consent in their district.

Witness: Quite so; we are not concerned outside their district.

With reference to the West Ham Corporation, you are willing to have it made clear that the works that are used in the Corporation area in West Ham shall not be discontinued for the manufacture of gas for a period of ten years?—We are.

Mr. *J. L. Godlee*, the Chairman of the West Ham Gas Company, examined by Mr. NEVILLE, said it was a fact that the business of the Company was increasing very rapidly. Of the capital that had been authorized by their 1902 Act, there was a balance now available for issue of £115,700. This balance was proposed to be cancelled in the Bill. In the 1902 Act, the Company were authorized to manufacture gas upon the lands referred to in East Ham; and in pursuance of this policy they had erected a gasholder there. They were advised that they must very shortly increase their works in a way they could not do on the spot. The present ground at West Ham was fully occupied, and there was not room for an increase there. Their late Engineer had advised them that, in the course of a very few years, they must be prepared to have works at East Ham. These would involve an expenditure of about £250,000, and would take three or four years to bring into proper working order. The margin of safety which they had to-day was about half-a-million feet. When they were going to increase the works, they would increase them economically and look forward to future years. The advice given them was that they would have to increase their works to make at least 2½ million feet a day. This would involve an entirely new set of works in connection with wharves and railway sidings, which would last for a good many years. For the first few years, their expenditure of capital would be largely upon works which would be intended for the increases they would get later on; and, consequently, they would be far from reaping the full value of the outlay in the increase of gas. The interest they would have to pay at 5 per cent., upon a quarter-of-a-million would be £12,500. The Gaslight Company approached them in the first instance; and as a result of the negotiations, they agreed on behalf of the Company to the terms set forth. These terms had not been before the shareholders exactly in the present form since they were slightly altered. This was in consequence of the arrangement with the County Council; but with that exception they had been ratified by the shareholders.

In cross-examination by Mr. COWARD, witness said the West Ham Company were in Parliament in 1902 for raising capital and getting power to manufacture on land at East Ham. He did not know that he was bound to define the words which had been discussed in Parliament—"and the suburbs and vicinities thereof and parts adjacent." They had not gone beyond the limits of their supply; but he was not prepared to say that they might not have gone into other parts of their area—into districts that those words might apply to.

In cross-examination by Mr. MORTEN, witness declared that the amalgamation was certain to be a benefit to the West Ham Company and to the shareholders; and any benefit they received involved a benefit to the consumers. They would be saved the expense necessarily incurred by the additional capital which they anticipated. If the amalgamation did not take place, it might involve an increase in the price of gas and other extra expenses. The benefit to the consumer would be that the price would remain the same. The price was not to be raised at present. It was more likely to be reduced under the amalgamation than it was under a separate Company working by itself and having the very large capital expenditure ahead of it; and it must involve a difficulty in getting a sufficient income to reduce the price and pay the statutory dividend. The price of the gas of the West Ham Company had for some time past been lower than that of the Gaslight Company. They were under an arrangement with the Gaslight Company that the price should be reduced to 2s. 8d. next Christmas. The West Ham Company, when they bought the land in East Ham, had the intention of using any works erected upon this land as subsidiary works. They had never contemplated transferring their works altogether from West Ham to East Ham.

Re-examined by Mr. HONORATUS LLOYD, witness said, with regard to the Ilford Company, if it was provided that the Gaslight Company should not either supply gas or lay a main within their district without their consent, he would have thought it did not leave any possibility either of litigation or competition. They had certainly considered the consumers in West Ham before they made their arrangements; and instead of their position being adversely affected, on the contrary, it would probably be benefited.

Mr. *H. E. Jones* said he had considered this matter, and had seen the West Ham works. In his opinion, they were certainly not in a position to deal with increase. They were so crowded at present that they were really not working to the best economy as they stood to-day. He was satisfied, having regard to the returns and to the nature of the district, that an increase in demand must take place.

The CHAIRMAN: I do not think you need go into that, Mr. Lloyd; it is not raised by anybody else.

Mr. HONORATUS LLOYD said this was the case on behalf of the promoters of the Bill.

The CHAIRMAN said the Committee would like to know from Mr. Lloyd if they had gone outside any of the wards, parishes, districts, or hamlets named.

Mr. HONORATUS LLOYD replied that it frequently happened that just on the boundary a few houses were supplied over the boundary one way or another. He was instructed that there had been no supply in the ordinary sense of the term—deliberately going into a district for the purpose of giving a supply. The Solicitor to the West Ham Company informed him that there was one place at Chigwell, on the north-east. There was a site, and that was within the area of the Chigwell and Woodford Gas Company. There were a few houses supplied there for the mutual convenience of the Chigwell and Woodford Company; and with the arrangement between the two, it was inconvenient to the Chigwell and Woodford Company to supply.

Mr. FREEMAN complained that he found himself in a somewhat difficult position, because when he asked certain questions of Mr. Woodall, he understood that he was practically, although not in express words, prepared to give him a condition, upon which a great deal of his opposition would have gone; but he was now informed that, although Mr. Woodall said this, the Company were not in a position to accept anything definitely from him in respect of the giving up of the West Ham works.

Mr. HONORATUS LLOYD said that Mr. Woodall did not withdraw a single word of what he said.

Mr. FREEMAN: I did not say he did. I said the people advising the Company.

Mr. HONORATUS LLOYD: And the people advising the Company do not withdraw a single word that Mr. Woodall said.

The CHAIRMAN: I understood from the last witness that he was prepared to give some sort of undertaking. I understood from Mr. Woodall that, although he would not tie himself down to a certain clause which you put forward, he was prepared to give some sort of undertaking, to be agreed hereafter, that the works would be kept open. I think Mr. Woodall said he would not agree to the clause you put before him, but that he would agree to keep the works open.

Mr. FREEMAN said that as the Bill stood at present he objected to it *in toto*. He was absolutely opposed to any amalgamation on the terms of the Bill proposed. His position was that he represented the municipal authority, and he had to look after the interests of the inhabitants; and he considered it of so vital importance that the works should be kept open, and kept open practically in the same way that they were now being used, that if he could have a proper undertaking to this effect he would not be disposed to oppose the Bill in the way he otherwise should if he did not get the undertaking. It would satisfy him, no doubt, if the Company would undertake that for the next ten years they would not close the West Ham works, and would substantially use them for the manufacture of gas.

Mr. HONORATUS LLOYD accepted this.

Mr. FREEMAN: And thereafter subject to the consent of the Board of Trade?

Mr. HONORATUS LLOYD: No; ten years.

Mr. FREEMAN read the effect of his suggestion as follows:

The Gaslight Company shall not close the existing works of the West Ham Company within the borough, or discontinue at such works the manufacture of gas for the supply of the West Ham district, or reduce the staff (either workmen or clerical) below what it is at the date of transfer for a period of ten years from the said date of transfer, nor shall the said Company so close the said works, or discontinue the manufacture of gas at such works, or reduce the number of the workpeople employed thereat, after the expiration of such period without the written consent of the Corporation, but that consent shall not be unreasonably withheld. If any question arises whether such consent is unreasonably withheld, such question shall be decided by the Board of Trade, after taking into consideration all the circumstances of the case, and any representations made to them either by the Company or the Corporation.

This was surely a perfectly fair thing to agree. After ten years, they neither of them could tell exactly what might be the state of things. Then if the Gaslight Company wanted to close the works, they would apply for their consent; and if they unreasonably withheld it, the Board of Trade should decide between them.

The CHAIRMAN: The difficulty the Committee are in is this, that the proceedings seem to be rather irregular, because we have been discussing clauses on the opposition to the Bill. As I understand it, Mr. Freeman is opposed to the Bill as a whole. But it practically comes to this, that you would be prepared to withdraw if you got the clause, and you do not feel inclined to take up the time of the Committee by giving general evidence. At the same time, I think it rather hard for the Committee to have to argue upon the clauses of the Bill before they have decided whether or not they are certain that it is going to be passed.

Mr. FREEMAN announced that he would have no alternative but to go on with the preamble if consent were not given to his terms.

Mr. *A. W. Littler*, the Mayor of the County Borough of West Ham, examined by Mr. MORTEN, mentioned that the borough had an area of about 7¼ square miles, and contained a population of over 300,000. The West Ham Gas Company, in addition to supplying the borough of West Ham, supplied certain other districts outside the borough. According to their records, as far back as 1889 the question of the purchase of the undertaking of so much of the West Ham Company as lay within the borough was brought before the Council. Correspondence took place upon this between the Borough Council and the Company; and the gist of the matter was that the Town Council were informed by the Company that the undertaking was not for sale. No information was conveyed to the Corporation, either directly or indirectly, that the Company were willing to sell their works until the parliamentary notices were published in November last. When they heard that an arrangement was in contemplation, the Council took the general position very seriously into consideration, and applied to the Company for information to place them in a better position to judge whether they should open up negotiations for immediate purchase or not; and such information had been definitely refused. At present the Council were in the dark as to what the purchase of the undertaking would mean. They had been approached by a good many of the inhabitants and ratepayers in the district with regard to the proposed Bill, both by public deputation as well as every member of the Council being privately approached on the matter, urging opposition to the Bill on the ground of the injury it would do to the borough in disturbing existing conditions. One of the dangers they anticipated might possibly arise was that the West Ham works might be closed. The natural result would be the reduction of the rateable value and the throwing out of work of both ordinary workmen and clerks and others employed at, or in connection with, the works. So far as they could see, no advantage could possibly be gained by the ordinary consumer from amalgamation. His own opinion was that it would be rather the reverse. The shareholders in the West Ham Company were not necessarily inhabitants of the borough. He believed that the majority of the stock and shares were held entirely outside the district to-day, which, of course, was not so at the time of the inception of the Company. The general feeling in the Council—and he was quite sure of the majority of the people of the borough—was that under no circumstances should the amalgamation take place if there were any possible means of its being prevented, even to the extent of the purchase by the Corporation rather than that the risk should occur of the works being

closed, or even being closed in the place where they were to-day. If the Corporation had been able to get the necessary particulars, they would decidedly have consented to the purchase.

In cross-examination by Mr. HONORATUS LLOYD, witness said, with regard to the consumer being injured, from his point of view the very fact of creating a larger monopoly there would—and the whole of the supply in the surrounding district generally did—tend to an increase of price rather than in the other direction.

Mr. HONORATUS LLOYD: Do you mean that the largeness of a gas undertaking tends to a higher price?

Witness: I think the fact that the whole of the supply in the surrounding districts right through will be in the hands of one concern has generally a detrimental effect on cheapening commodities.

Then the principle of what you are saying is that if you grant an ordinary monopoly you have to pay a higher price?—Yes; generally I believe that is so.

Replying to further questions, witness said he knew that when Parliament granted a monopoly it granted it upon statutory terms. The West Ham Company had such a statutory monopoly to-day. He thought the consumer would be injured by the proposed amalgamation, because the reduction offered in the standard clause in the new Bill was, in his opinion, not so advantageous as the maximum 2s. 11d. at present in force in the West Ham area. He was satisfied if the proposal was now 3s. 2d. He would not think it right or reasonable to ask that the Company should maintain for all time every man who was in their employ at the present moment, irrespective of the season. Ten years to be bound not to touch it, with the proviso that was put in also, that if the Gaslight Company did wish to close the works they were willing to submit to the arbitration of the Board of Trade, to his mind suggested a very fair settlement.

In re-examination by Mr. FREEMAN, witness said that, as regarded the period beyond the ten years, the Board of Trade were specially created to deal with all questions of dispute and arrangements between public authorities and companies. The only fair way, in his opinion, if they and the Company did not agree, was for an impartial arbitrator to come in; and he could not imagine anybody more impartial than the Board of Trade, with whom they would be quite satisfied.

Friday, March 26.

On the resumption of the proceedings to-day,

Mr. FREEMAN, on behalf of the West Ham Corporation, said that since yesterday they had been carefully considering the question of evidence, and they had come to the conclusion that it was not necessary, at the present stage of the inquiry, to trouble the Committee with further evidence. The extremely important point which the Corporation looked at was safeguarding, so far as they could, the interests of the ratepayers and consumers of gas within their district. The Bill affected them by proposing to carry out an amalgamation between the Gaslight and Coke Company and the West Ham Company, with complete control of the smaller Company by the larger one as soon as the amalgamation had taken place. They had not been, until they came into the Committee room, in the position of having any definite information as to what the future proceeding of the West Ham Company was going to be, or what the terms of purchase were going to be, or the amalgamation. They had had to feel their way in the dark by more or less ineffective cross-examination, owing to lack of knowledge. But they had been gradually coming to the conclusion that the proposals of the Bill, although they were advantageous to the Gaslight Company and to the shareholders, and particularly to the Directors of the West Ham Company, would have no public benefit to the inhabitants whom they represented. They objected to the passing of the Bill in their corporate capacity; and they asked the Committee to say that, unless some public case could be made out very much stronger than any public case had been made out up to the present moment, they would not sanction, merely for the convenience of two trading Corporations, a Bill which was altogether against the public interest. What was the advantage to the public which was suggested here? It was evident what the advantages to the shareholders would be. The only suggestion of advantage to the consumers was that the Gas Company would soon, and at no distant time, have to spend certain money on increasing their plant, and that they might possibly have to raise the price of gas. It was the duty of every gas company from time to time to increase their plant as their area and the demand increased; and it stood to reason that if a gas company were properly conducting their affairs, in a very short time the expenditure which they were making on increasing their plant became directly remunerative by the bringing in of fresh customers. Unless they were within a measurable distance of arriving at the limit of their tether, that was the justification for spending capital; and therefore that was a matter which they would be perfectly prepared to face. There being no difference between the position of this Company and that of any other, they would be prepared to face the remote risk of having the price of gas raised. They desired, in the first place, to preserve to their inhabitants all the benefits which they received at the present time; and if the Gas Company desired to dispose of themselves to somebody else, then the Corporation said that, having regard to the practice of Parliament during modern times, they should be in a position to determine themselves whether it would not be in the interest of the public that they should buy the Company. They had been refused information; but they now had more information. This was the sole advantage which it was suggested the consumers would derive from the amalgamation. What, on the other hand, were the disadvantages? If the Gaslight Company acquired the undertaking, they had an absolute right, as the Bill stood, to do whatever they pleased in carrying on their works—that was to say, they might, in the interests of their own shareholders, remove the manufacture of gas from West Ham, where it had been carried on all these years, to one of their other places where they had surplus works. What would be the result of this? It would be obviously two-fold. It would take away from them the employment of a considerable number of persons who were at the present time in employment—it would increase, to a substantial extent, the number of persons who were on the unemployed list (which was an exceedingly crying question in West Ham); and it would have the further great disadvantage of removing from the district an exceedingly valuable piece of rateable property. Therefore it was not to be wondered at that the Corporation of West Ham were most strongly opposed to the Bill in the form in which it now stood; and he asked the Committee to reject it. So important did they consider this question of the unemployed and the rateable value, that if his learned friends had been prepared to bring forward a clause on their own motion to fairly and justly safeguard them in respect of this matter—not for a limited period but for all time, subject to the discretion of the Board of Trade, who were the proper authority to deal with it—it would have been a serious point of consideration for them whether they would not have waived their objection. But there had been no proposal that they could accept. They were absolutely at large; and the Bill gave them unfettered power. Under these circumstances, he desired to put his opposition on the broadest possible ground—not upon technicalities nor testing, but upon the ground that Parliament would not sanction amalgamtion merely for the benefit of the shareholders and the Directors of the two Companies, that Parliament would require to see that the interests of the consumers were safeguarded, and that the interests of the Local Authority were also properly protected. Unless the promoters, even at this hour, were prepared to make full and proper concessions, he asked the Committee, on behalf of the West Ham Corporation, to utterly reject this Bill, and say it was impossible.

Mr. COWARD, on behalf of the Ilford Gas Company, announced that he did not propose to call evidence in reference to this matter. His objection was to the wide and indefinite words—"and the suburbs and vicinities thereof, and parts adjacent"—which were sought to be re-enacted in clause 3 of the Bill. It was contrary to the practice of Parliament. Since 1860, it had always been the practice of Parliament to confine gas companies within well-defined limits. This re-enactment in clause 3 of the Bill of section 12 of the West Ham Act of 1856, which at the end of the Bill was repealed in the schedule, he ventured to think was objectionable, because it would give a new life to those vague and indefinite words which Mr. Woodall admitted were obsolete; and these words would be construable as applying to the present conditions of the places and parishes named, and not in relation to the conditions which existed in 1856, when West Ham consisted of small scattered places and parishes, whereas it now had a large population. As regarded the question of the limits, Mr. Woodall said they would give them full protection; and this was perfectly fair. When the West Ham Company were in Parliament in 1902, Ilford raised the question of these indefinite words, and endeavoured to get them deleted; but it was argued against them that they were not entitled to have this repealed in 1902, but that there should be a clause put in providing for consent. A totally different state of things, however, arose here. The promoters were seeking, by the clause, to re-enact this legislation; and the evidence before them was that this was an obsolete form of legislation, totally contrary to the action of Parliament. It was dangerous enough in the hands of the West Ham Gas Company; but they thought it was a great deal more dangerous in the hands of these great monopolists. He asked the Committee now, where no good cause existed, to delete the words. With reference to other words in the clause—that "the undertaking of the West Ham Company included all rights of making, distributing, and supplying gas, and all other the rights, powers, authorities, and privileges whatsoever, and whether statutory or not of the West Ham Company, and all property whatsoever and wheresoever," &c.—he took exception to the words "whether statutory or not." According to the evidence, the Governor of the Gaslight Company admitted that his objection was well founded.

The CHAIRMAN asked whether Counsel had any precedent for the exact wording where the limits were altered.

Mr. COWARD said not. It would have been very difficult in a case like this. It could be only by clearly defining the words; and, of course, as it stood at present, it seemed there was no necessity.

The CHAIRMAN: You say that it is an obsolete form of words. But have you got any precedent where what you call an obsolete form of words is altered in a subsequent Act of Parliament and more clearly defined?

Mr. NEVILLE: We lay no particular stress on these words in the definition clause. We are quite willing to give Ilford everything they want, and we object only that Ilford should take the whole matter upon their back. If the Committee think fit to deal with the clause in the way suggested, I do not know that there will be any objection. Continuing, Counsel remarked that, with regard to the points raised by Mr. Freeman, it had been very properly said that the opposition of the West Ham Corporation was practically a clause opposition—an opposition which had had no real backing behind it. If there had been anything in the opposition of the West Ham Corporation, they would have produced cogent and strong evidence on the point. With regard to there being no safeguards to the ratepayers and consumers as to the argument concerning rateable value, there was absolutely nothing in it. The works at Bromley were in the district of West Ham; and, therefore, if the manufacture of gas was going to be removed in any way, it would be removed to Bromley, which were the nearest works, and which had a surplus capacity of something like 7½ million cubic feet. Supposing the amalgamation did not go through, what would be the result? They had it in evidence that the West Ham Company had procured, under their Act in 1902, a site of 40 acres in East Ham; and when they obtained this site, they got it chiefly on the ground that it had facilities for gas making. When the West Ham Company bought the site, they procured it for the purpose of carrying on gas making there; and any increase would, of course, be carried on upon that site. Therefore, so far as West Ham was concerned, no harm would occur to the ratepayers by the amalgamation; on the contrary, the rateable value, so far as that was concerned, would be precisely the same, because it depended largely upon the mileage of mains within a particular area. The real objection that had been taken, as he understood it, was not on the ground of the consumer. There was no question of price; but there was the question with regard to the removal of the works. He did not know that it was possible for anyone to give a more explicit assurance than Mr. Woodall gave. Parliament never had been asked, and never certainly granted, any application which was intended to be uneconomical. Parliament would never force any person to enter into a definite agreement to carry on works which, on the face of it, must be uneconomical;

mical; and therefore Parliament, he took it, would not force any company to undertake definitely to employ a certain proportion upon a place which might turn out in the course of years to be uneconomical. He submitted that the offer made by Mr. Woodall was as fair an offer as could be made by any person. There was an engagement that for ten years the manufacture of gas should take place where it was now. Mr. Woodall said he would not admit any limitation as to the number of men; and that was not an unreasonable thing to say. He submitted that this was not a matter that ought to be imposed on the Company. The hollowness of the opposition was accentuated by what Mr. Freeman had said when he stated that, rather than have amalgamation, the Corporation of West Ham would accept an increased price of gas. As they were competitors in this particular area, the Committee could easily understand what was the value of such a protection, from the consumers' point of view, by the Corporation. Mr. Freeman had said that information was not before the West Ham Corporation. He would point out that the accounts of the two Companies were published, and the reports of the two meetings; and not only that, but the Corporation themselves took the advice of their Treasurer and their Gas Examiner. There was no suggestion made by Mr. Freeman or anybody on behalf of the West Ham Corporation that the statement was incorrect that the proposed amalgamation would be of advantage to the consumers in the areas affected. As to the saving of £250,000 for the new works, the way to look at that was this—it was not only a saving of £250,000, but there was at the present time surplus power within reach of West Ham which would be able to be utilized. So that there was a double saving. They had an advantage not only for West Ham, but an advantage which was all over the Metropolis supplied by the Gaslight Company. In the Bill, they took powers to cancel the unissued capital of the West Ham Company. This amounted to £115,000; so they were not only avoiding the raising of new capital, but cancelling old capital. Among the other advantages which were proposed by the Bill was a reduction of 2d. in the standard price, which was a very large reduction; and there was also the important point with regard to the agreement with the London County Council. The County Council and most of the authorities in the West Ham area approved of the Bill. Then they had the point about purchase. This was disposed of by a reference to the map. If West Ham were to come and ask for powers to purchase the undertaking, they would, of course, be purchasing the plant which was intended for a district double the size of their own area. The consequence would be that the consumers of gas within their own area would have to pay for the surplus plant which their own Corporation would be buying; and the result would be that there would be an increase in the price of gas. The evidence which had been given by Mr. Corbet Woodall upon the various points that arose here showed that a case had been made out for the passing of the Bill. It was a measure which, if it was passed, in fact made for an ultimate reduction in the price of gas. It spread any need there might be for expenditure in West Ham over the whole of the gas consumers and the whole of the shareholders in the county of London. So there was an advantage in every way in price; and, in addition to this, they were saving actually capital sums which in the future would enable the price of gas to be reduced.

The Committee having consulted in private,

The CHAIRMAN subsequently said: The Committee find the preamble of the Bill proved; but they will require a clause to be inserted for the benefit of West Ham, in regard to keeping open the present works for a period of ten years on substantially the same scale as at the present time. They will also require an alteration in clause 3, as to the limits of supply, and one other point which will come up for discussion on clauses.

Mr. C. E. C. BROWNE (of Messrs. Dyson and Co., the Parliamentary Agents for the Bill) stated that in the course of the discussion some very important points had been raised with the London County Council and the Corporation of London. Clauses were now under consideration; and he was sorry to say that there had not been sufficient time for them to send the promoters their observations on them. He would therefore ask the Committee to adjourn going through the clauses until they had disposed of the next Bill on the list.

Mr. FREEMAN, on behalf of the County Council, agreed that they were all matters affecting the public interest, and it would be a great pity if any ambiguous wording were put in.

The CHAIRMAN agreed. He understood that there were very important negotiations going on with these two bodies. The Committee would therefore put the Bill in the list for clauses on Thursday next.

Increased Gas Business at Exmouth.—The report presented at the annual meeting of the Exmouth Gas Company last Tuesday set forth that the balance to the credit of the profit and loss account was £4314; the proportion of profit for the year having shown some diminution owing to the high price of coal. Payment of the usual dividends of 10 and 7 per cent. on the two classes of ordinary shares would absorb £830, and leave a balance of £3484 to pay the interest on the debenture stock, preference shares, &c. The quantity of gas made was 59,525,720 cubic feet, which was equal to 9988 cubic feet per ton of coal carbonized; and the sales were 51,474,783 cubic feet. The unaccounted-for gas was 6,314,931 cubic feet, or 10·6 per cent. on the make. The Rev. C. R. Carr, the Chairman of the Company, in moving the adoption of the report, said there had been a very satisfactory increase in the business done by the Company, but there had also been a very portentous rise in the price of coal. Fortunately, however, the contracts under which they were now working were more favourable than the last; but the prospect was not cheering, and they had yet to see the effect of the Eight Hours Act on the coal market. Advice was being taken as to the improvement of the works; but, in view of the present disquietude and want of confidence, caution would be exercised, and no more than was urgent would be carried out. The leakage had been very great, owing to the damage caused to the mains and services by traction engines. The thanks of the Directors and shareholders were due to the Manager and Secretary (Mr. J. T. Foster) and to the officials, for their continued efforts to secure good results and economy at the works. The report was adopted, and the dividends recommended were declared.

MOUNTAIN ASH GAS BILL.

Local Legislation Committee.—Tuesday, March 23.

The Bill promoted by the Mountain Ash Urban District Council came before the above Committee to-day. Sir FRANCIS LEYLAND-BARRATT presided; the other members being Mr. BOWLES, Mr. FLETCHER, Mr. GARDNER, Mr. KENNEDY, Mr. MANFIELD, and Dr. COOPER. Mr. BOYCE was present as representing the Local Government Board.

Mr. WEDDERBURN and Mr. KEEN appeared in support of the Bill; and Mr. CHARTERIS represented certain petitioners against it.

Mr. WEDDERBURN, in opening, said there was a population of 42,000 in the Mountain Ash district. They ran their own gas and water works, and in regard to electricity they had a Provisional Order.

Mr. *Henry P. Linton*, the Clerk to the Council, proved the preamble of the Bill, and pointed out that when the measure was considered by the Council there was almost a unanimous vote in its favour. At a meeting of the ratepayers 64 people attended, and only 3 voted against it. The gas and water works were regulated by the Mountain Ash Local Board Act, 1886, and the Mountain Ash Water and Gas Act, 1900. In 1901, they obtained an Electric Light Order from the Board of Trade.

The Committee then proceeded to consider clause 4 of the Bill, with relation to the charge for gas through prepayment meters. On this, the Local Government Board pointed out that sub-clause 3 did not follow the form of the Model Clause of 1908. The Home Office report drew attention to the same point, and said that it would apparently have the effect of enabling the Council in certain cases to call upon the consumer, after the money in the meter had been collected, to make an excess payment in addition to the sum already paid. This would be contrary to the principles which had been hitherto observed by Parliament in allowing provisions with regard to prepayment meters. A similar proposal which appeared in the Swinton and Mexborough Gas Bill of last session was required to be omitted.

Mr. WEDDERBURN said the clause in the Bill dealt with prepayment meters. The first part of it followed the Model Bill; but one portion of it did not do so. The first sub-clause was: "The Council may demand for any gas supplied through a prepayment meter a not greater charge than for gas supplied to private consumers within their limits of supply through any other kind of meter or by any other method of supply." Sub-section 2 ran:

> The Council shall not charge for the hire of any prepayment meter and fittings to be used therewith any sum other than a sum of money calculated according to the quantity of gas supplied through such prepayment meter, and the maximum to be so charged shall be at the rate of 10d. per 1000 cubic feet supplied in manner aforesaid, such sum to include the hire of meter and the fittings used therewith, or at the rate of 1s. per 1000 cubic feet if such fittings include a cooking-stove. The said charge shall include the providing, letting, fixing, repairing, and maintenance of the meters and fittings, and the cost of collection and other costs incurred by the Council in connection with the meter and fittings.

This was a Model Clause. But sub-section 3 differed from the Model Clause, and was: "The maximum charge for the hire of a prepayment meter without fittings shall be at the rate of 8d. per 1000 cubic feet of gas supplied through such meter." He failed to see why there should be a difference in the basis of charge for a meter with fittings and one without fittings. They were proposing to have the same principle of charge—namely, the amount of gas supplied, whether it had fittings or not, the more the fittings the more the charge, 10d. on the fittings, 1s. if it included a cooking-stove, and without fittings 8d.

The CHAIRMAN: You are doing away with the question of a special sum for the hire of the meter altogether. In the Model Bill there is a special charge made for the hire of the meter.

Mr. WEDDERBURN replied that in their Bill there was also a special charge, only on a different basis. In the case of the Swinton Bill last year, the model form was altered; and they were here following that precedent—that the charge for the hire of a prepayment meter without fittings should be on the basis of the amount of gas taken through the meter. It was always an additional charge—that, in addition to what was paid for the gas, there should be a charge of 8d. per 1000 cubic feet for hire of meter. The advantage of having it on the basis of so much per 1000 cubic feet of gas was that one was able to put into the slot money which would pay both for the rent of the meter and for the gas supplied at the same time. This could not be done with the 10 per cent. basis.

The CHAIRMAN: Supposing a man were to put in his penny for the amount of gas, and did not put it in for the hire of the meter, What would happen?

Mr. WEDDERBURN said the penny would cover both, and he would get the same amount of gas. There was a proviso which was not in the Swinton Gas Bill. It was as follows: "Provided that in any case where the amount to be paid to the consumer shall not exceed an amount equal to the rate of 10 per cent. on the cost of the meter, the Council shall be entitled, if they think fit, to make a minimum charge not exceeding the last-mentioned amount." The object of this was that if they were to have the Swinton clause there must also be a minimum, in order to secure to the Council a fair rent if the meter was not used at all.

The CHAIRMAN: Under the model form you get your rent for the meter safely, whatever amount of gas went through.

Mr. WEDDERBURN: Yes; but not in the case of a meter with fittings. That was a different basis. Continuing, Counsel said they did not alter the clause with regard to meters with fittings. They made the basis of the charge the same whether they had fittings or not; and in the case of meters without fittings, they made themselves secure of a minimum rent. He pointed out that the proviso in the Swinton Bill was struck out in the Upper House, although it was passed in the Lower House.

Mr. *W. G. Thomas*, the Gas Engineer to the Council, said he did not see why the principle upon which the basis was made should vary in the case of a meter without fittings and one with fittings. The

arrangement for the slot meters was worked by mechanism which enabled them to supply from 18 to 50 feet for 1d. If an installation was put in with a meter, fittings, and stove, the extra amount which should be paid instead of hire for the fittings, meter, and stove under the clause would be 1s. Taking their present price of 3s. 8d., that would mean 3s. 8d. per 1000 cubic feet, *plus* 1s. The meter would then give a 56th part of 1000 cubic feet. for 1d. In collecting the charge through the meter, it was so arranged that they added on the charge for hire to the price of the gas, and collected the two together. If it were done on the basis of 10 per cent. on the cost of the meter, the meter was arranged to charge for the gas only, and they collected the 10 per cent. at the end of the quarter. The idea of the slot meter was to put meters into houses of people who could find a few pence at a time, but who were not prepared to meet their bills at the end of the quarter. If a meter was paid for through the pence put into the slot installation, a person might apply to the Council for gas, have a meter put in without an installation, have his own fittings, and perhaps put only three or four coppers in for a quarter. In some way or other the expenditure of the Council should be covered, and a substantial use of the meter should be secured. Under the other system, they had to collect 9d. at the end of each quarter for the meter. On an average, the quarterly consumption of these meters was from 8000 to 10,000 feet—equivalent to about 35s. per quarter.

Mr. GARDNER pointed out that in the summer quarter one might only need to put a few coppers into the meter, and in the darkest quarter of the year he might use a good deal more gas.

Witness said the difference between the price with and without fittings would be 2d.; and it would be the same with the cost of the meter. With fittings, they could get contractors to put in what they called 5s. a point, which meant 5s. a light, with a minimum of two lights.

Mr. BOYCE said that what the Home Office had in mind, he thought, was the principle that the person who used the gas paid for it, and the person who might be responsible for the non-use of the gas would still have to pay the meter rate under the proviso.

The CHAIRMAN said the only one they could come against was the person who was the contractor for putting the meter in.

Mr. BOYCE: It is undefined whom they make this charge against.

The CHAIRMAN: The Home Office objection is to the fact that a man has to pay for his meter after he has already put a penny in the slot, which he does under the Model Clause. But the Model Clause already does that. Under the Model Clause, if I have a meter without fittings, I have to put a penny in the slot and also pay 9d., the rent for my meter; and that is what the Home Office object to. They are objecting to the Model Clause.

Mr. WEDDERBURN: Yes, and that is what our clause to a large extent will do away with. The subsequent payment will then only arise in cases where a man has not made use of the meter.

The CHAIRMAN (to witness): To a *bonâ fide* consumer of gas, do you think this would lay any further expenditure upon him?

Witness: No.

But simply in the case of a person who puts in one for the convenience of a stand-by light, you would ensure that the Council obtained a proper interest for the use of the meter?—Yes. If the clause is not in, there is nothing to prevent a person coming into the district asking for a meter to be put in, having no fittings connected with it, and leaving it in the house.

Mr. BOWLES: But to the *bonâ fide* consumer of gas, surely 10 per cent. on the cost of the meter would be cheaper to him?

Witness: If he would be a big consumer, he would not apply for a slot installation. If he is a *bonâ fide* consumer, he is covered by the 8d.; and there would be no collection at the end of the quarter.

Mr. BOWLES remarked that the risk of non-use in the case of a meter without fittings was obviously greater, and therefore the Council must have some security of getting something.

Mr. WEDDERBURN said the curious thing was that the Model Bill did not provide that something.

The CHAIRMAN: It looks as if, under the Model Clause, if I have a meter in my house during the summer months and have no gas, I should have to pay 9d.; but if I have a meter in the summer months and choose to consume 9d. worth of gas, I should get the gas and not have to pay a quarter's rent for the hire of the meter.

Mr. WEDDERBURN: Yes; you would gain in the summer, though you might suffer slightly in the winter. The seasons would balance.

After consideration, the Committee accepted the clause in the Bill.

On clause 5, an interesting discussion arose with regard to the supply of gas where a consumer had a separate supply. The clause read:

> Notwithstanding anything contained in the Gas-Works Clauses Act, 1871, or any other Act, a person shall not be entitled to demand from the Council a supply, or the continuance of a supply, of gas for premises having a separate supply—that is to say, a supply from an installation other than that of the Council—unless he shall have previously agreed to pay the Council such minimum annual sum as will give to them a reasonable return on the capital expenditure and standing charges incurred by them to meet the possible maximum demand for these premises, and the minimum annual sum to be so paid shall be determined in default of agreement, by arbitration.

The Local Government Board reported that this was an exceptional clause in regard to the supply of gas. The Council were protected by section 11 of the Gas-Works Clauses Act, 1871, in respect of capital expenditure incurred in the laying of pipes; and the clause should not be allowed.

Mr. WEDDERBURN said the clause was a very common one for electricity; but it was to meet the case of those persons who only had the Council's supply as a stand-by. The Council had a case of a laundry who had a supply as a stand-by, and the Council got nothing, though they had to give the laundry an installation and everything that was necessary. In a case of this kind, there ought to be, if possible, an agreed sum to cover the expenses payable to the Council. He thought it would be well to add after "separate supply," the words "either of gas or electricity," because electricity was used for both power and light. A man ought not to have both gas and electricity upon his premises and treat one of them as a stand-by.

Witness said that in the case of the laundry at Mountain Ash they had generated their own gas for driving an electric plant. When the plant broke down, they came upon the Council to run their engines on the town gas. In still another instance (the Pavilion) they were now putting down a suction-gas plant and wanted the Council gas as a stand-by. The main passing the Pavilion was a 4-inch one leading to a district which was rapidly increasing. If the Pavilion took off their supply from the Council, the 4-inch pipe would supply the new district. But if they continued to take a third-of-a-million cubic feet per quarter, the Council would have to put a 6-inch pipe down to supply them and the district beyond. The Council might, now that the Pavilion was holding it as a stand-by, still have to put a 6-inch pipe past them, which might not be used at all except perhaps once a year. Gas should be on the same footing as electricity.

The Committee passed the clause without the addition suggested.

Clause 6, with regard to power to lay pipes in streets not dedicated to public use; clause 7, as to gas consumers giving notice before removing; clause 8, giving power to require the use of anti-fluctuators for gas-engines; and clause 9, with regard to the period of error in defective meters—were passed without discussion. Clause 10, relating to the power to lay pipes in streets not dedicated to public use, was slightly varied from the Model Clause; but the Model Clause was inserted in the Bill.

Mr. KEEN, dealing with the provisions of the Bill relating to water, said that clause 11 gave them power to enter buildings for the purpose of inspecting the fittings, and followed section 20 of the Merthyr Tydfil Act of 1903. The Home Office considered the clause unnecessary, in view of section 57 of the Water-Works Clauses Act. But the clause gave the Council's Surveyor power to enter, between certain hours, any house or premises which they supplied with water, "in order to examine if there be any waste or misuse of such water." If he were prevented from entering such premises, the undertakers might turn off the water. The Surveyor was empowered thereby, not only to see whether there was waste of the water, but whether the fittings were in good repair.

The CHAIRMAN: But if there was no waste or misuse of the water, could they come to my house and say: "I do not think that tap is in proper repair; you must replace it"?

Mr. KEEN replied that there was no penalty unless it could be proved that there was actual waste or misuse. If the Surveyor or the other authorized person was prevented from making an examination, the occupier was liable to a penalty.

The CHAIRMAN said unless the promoters could bring further arguments, the Committee were not prepared to grant clause 11 as it stood; but he thought they might have the clause out of the Model Bill.

Mr. KEEN said that, upon perusal, they preferred the Model Bill, and wished to include it and repeal section 45 of the Act of 1886.

The CHAIRMAN said they would repeal section 45 of the Mountain Ash Local Board Act, 1886, as from the date of making new bye-laws, and the Model Clause would be included in the Bill.

The Bill, as amended, was then ordered to be reported.

To make quite clear what the final determination of the Committee was in the matter of fixing a minimum charge for the prepayment meter supply, and as to an allowance of a fixed charge for the use of gas as a stand-by, it will be well to reproduce in their entirety clauses 4 and 5 of the amended Bill, for a copy of which we are indebted to the Agents (Messrs. Baker and Co.).

CLAUSE 4.—Charge for Gas Supplied by Prepayment Meters.

(1) The Council may demand for any gas supplied through a prepayment meter a not greater charge than for gas supplied to private consumers within their limits of supply through any other kind of meter or by any other method of supply.

(2) The Council shall not charge for the hire of any prepayment meter and fittings to be used therewith any sum other than a sum of money calculated according to the quantity of gas supplied through such prepayment meter; and the maximum sum to be so charged shall be at the rate of 10d. per 1000 cubic feet supplied in manner aforesaid—such sum to include the hire of meter and the fittings used therewith—or at the rate of 1s. per 1000 cubic feet if such fittings include a cooking-stove. The said charge shall include the providing, letting, fixing, repairing, and maintenance of the meters and fittings, and the cost of collection and other costs incurred by the Council in connection with the meter and fittings.

(3) The maximum charge for the hire of a prepayment meter without fittings shall be at the rate of 8d. per 1000 cubic feet of gas supplied through such meter: Provided that in any case where the amount to be paid by the consumer shall not exceed an amount equal to a rate of 10 per cent. on the cost of the meter, the Council shall be entitled, if they think fit, to make a minimum charge not exceeding the last-mentioned amount.

(4) For the purposes of this section, the expression "prepayment meter" means any meter or appliance by which the quantity of gas supplied is regulated according to the amount of money prepaid therefor.

CLAUSE 5.—Supply of Gas where Consumer has Separate Supply.

(5) Notwithstanding anything contained in the Gas-Works Clauses Act, 1871, or any other Act, a person shall not be entitled to demand from the Council a supply or the continuance of a supply of gas for premises having a separate supply (that is to say, a supply from an installation other than that of the Council) unless he shall have previously agreed to pay the Council such minimum annual sum as will give to them a reasonable return on the capital expenditure and standing charges incurred by them to meet the possible maximum demand for those premises; and the minimum annual sum to be so paid shall be determined, in default of agreement, by arbitration in manner provided by the Arbitration Act, 1889.

A Local Government Board inquiry was lately held by Mr. F. C. Stanford into applications by the Ashby-de-la-Zouch and Swadlincote Urban District Councils to borrow respectively £2018 and £6054 for purposes of water supply, including the execution of works in the parish of Repton.

NORTHALLERTON WATER BILL.

This Bill, which is to empower the Northallerton Urban District Council to construct additional water-works, came last Thursday before a Select Committee of the House of Commons, presided over by Mr. Rose. The petitioners against it were Mr. A. W. Bovill, Mr. Storey Barwick, and other millowners. Mr. Freeman, K.C., on behalf of the promoters, stated that the Northallerton District Council was constituted under an Act passed in 1891, by which they were limited to a supply of 120,000 gallons of water daily. As a matter of fact, the quantity was over-estimated; and in ordinary times the supply only amounted to 90,000 gallons, while in dry weather it fell to 80,000 gallons. At the present time the Council required at least 200,000 gallons; and by the Bill they were asking to impound the flood water—the excess water which would be of no use to anyone, even if it were allowed to run down stream. He called the Chairman of the Council (Mr. J. Guthrie), who said the promoters would not take the flood water from the stream until the flow was 575,000 gallons; and the reservoir proposed for the purpose of storing it was of a capacity of 15 million gallons.

Mr. E. W. Dixon, giving evidence on behalf of the petition of Mr. Barwick, said that under the Act of 1891 provision was made for the construction of a collecting-pond. The promoters had to provide for the stream some proportion of the water abstracted; and a compensation reservoir of a capacity of 15 million gallons was built. Owing to the accumulation of silt, however, its capacity was now only about 12 million gallons; and for some time it had been dry. There was difficulty at present in providing for the reservoir; but it would be still greater if the Council were to take the water as suggested in the Bill. The proposed reservoir would defeat the object of the one which had been constructed with the sanction of Parliament; for it would deprive it of a portion, at any rate, of the freshets which came down in the summer, and the landowners would get no compensation water. In the past, the District Council had been unable on many occasions to fulfil their obligation to furnish the requisite compensation water.

On behalf of the petitioning millowners, Mr. Shortt (Mr. Honoratus Lloyd, K.C., with him) assured the Committee that they had not the slightest desire to prevent the Bill passing, or to debar the locality from having the required supply. In 1891 they opposed the Bill, with the object of obtaining protection; and this was all that they now asked for.

Mr. Freeman having replied, the Chairman said the Committee were anxious not to impose any conditions which were not really practicable; and if a clause could be agreed, providing that the existing reservoir should be kept in a cleaner state, they were prepared to pass the preamble of the Bill.

A clause was then agreed between the parties, providing for the cleansing of both the existing and the new reservoir; and this having been sanctioned by the Committee, the Bill was ordered to be reported to the House.

Additional Powers for the Long Eaton Gas Company.

On Saturday, the 20th inst., Mr. Hamar Greenwood held an inquiry in the Board-room of the Long Eaton Gas Company with respect to an application made to the Board of Trade for a Provisional Order authorizing the acquisition of the Sandiacre gas undertaking, the extension of the Company's limits of supply, the construction of additional works at Long Eaton, and the raising of further capital. Mr. Honoratus Lloyd, K.C., who appeared for the promoters, gave a brief history of the formation and progress of the Company up to the date of the acquisition of the Sandiacre undertaking. He said that the capital now authorized was about £121,000. The prescribed illuminating power of the gas under their 1901 Act was 16 candles. Last year terms were arranged for the sale of the Sandiacre undertaking, and they were approved by the Board of Trade. To this there was no objection; and it would be to the advantage of the consumers, as the price of gas at Sandiacre had been considerably higher than at Long Eaton. It was proposed to extend the limits of supply to Stanton-by-Dale, Hopwell, Dale Abbey, Risley, and Kirk Hallam—the last-named place having subsequently been left out, while arrangements had been come to with Draycott with regard to supplying Hopwell. The population of these places, including Sandiacre, would be about 12,000. The objection raised was against the Company's proposal to erect additional gas-works at Long Eaton, chiefly because it was said this would depreciate the value of surrounding property; but in the course of his examination of the various objectors Counsel proved that out of the 299 owners or inhabitants living within the 300 yards limit there were only about four real objectors. He showed the necessity for the additional works in order to meet the present demands; the quantity of gas sold in 1898 being 51,308,000 cubic feet, while last year it was more than double this figure. The present price was 3s. per 1000 cubic feet, less 10 to 35 per cent. discount. The witnesses for the Company included Mr. Corbet Woodall, Mr. J. Ferguson Bell, and Mr. G. Stevenson, their own Manager and Secretary. The parties objecting were represented by Mr. T. Coward, K.C., Mr. H. H. Joy, and Mr. E. Williams; their special point being, as already stated, that the proposed additional works would seriously depreciate the value of the neighbouring land and property.

Financial Position of the West Lancashire Water Board.—According to a letter lately received by the Birkdale District Council from the Accountant of the Southport, Birkdale, and West Lancashire Water Board, the deficiency for the current year on the undertaking of the Board is estimated to amount to £16,200. This is a considerable advance on last year, when the deficiency was £12,882. In consequence of the increase, the precept on Birkdale has risen from £2853 to £3600; and the Southport precept will also rise from £9358, when it represented a 6½d. rate, to £12,600, which means approximately a rate of 8¾d. In 1907-8, the Water Board precept represented a rate of only 3½d. in the pound.

LEGAL INTELLIGENCE.

CUTTING OFF THE WATER SUPPLY TO A HYDRANT.

In the Court of Appeal, on Monday last week, Lords Justices Vaughan Williams, Buckley, and Kennedy had before them the case of *Delaney v. Earby Water Company, Limited*. It was an appeal by the defendants, asking for a new trial or judgment in an action which came before Mr. Justice Grantham and a Special Jury at Leeds in August last (see "JOURNAL" for Aug. 11, 1908). The grounds of the appeal were that the verdict was against the weight of evidence, and that, on the findings and the admitted facts, the defendants were entitled to judgment; further, that the Judge misdirected the Jury on substantial points.

The plaintiff was the owner and occupier, to some extent, of certain premises situated at Earby. He sublet the weaving-shed, but retained a certain part of the premises, and supplied power therefrom to the tenant. The property originally belonged to a Mr. Gill; and before 1891 it was supplied with water by the predecessors of the Company. All the water used for manufacturing purposes was supplied through a meter. About 1893, the plaintiff applied to have a hydrant fixed upon his premises; his reason being that he would get a reduction of 10 per cent. in his fire insurance if he had one. The Company accordingly laid a 3-inch pipe and fixed a hydrant; the cost (about £30) being paid by Mr. Gill. One condition under which the water was supplied was that it was only to be employed in case of fire, and that if it was misused the Company had power to withhold it. In May and June, 1907, the water was misused, and the supply was consequently cut off. There was no contract between the Company and Mr. Delaney. Two or three years after the hydrant was put up, Mr. Gill thought it would be a very useful thing if, when the boiler had to be replenished, he should be allowed to fill it from the hydrant instead of with water which came through the meter; and he approached the Company on the subject. It was then arranged that, under certain conditions, the water might be so used. In March, 1902, Mr. Delaney purchased the property from Mr. Gill; and the arrangement previously made with that gentleman was continued for a space of five years. In March, 1907, Mr. Delaney introduced a gas-engine into the works; and the engineer used water from the hydrant without giving the Company the specified notice. On this being discovered, the Company at once ceased the supply; and no application was made by Mr. Delaney for its continuance. About three weeks afterwards a fire occurred, which did considerable damage to the property; and the action was brought to recover the sum of £200, being the amount of the damage in excess of £375 paid by the insurance company. The Jury found for the plaintiff on the claim, and for the defendants on a counter-claim for £4, the price of the water improperly used.

Mr. Scott Fox, K.C. (with whom was Mr. Roche), contended, on behalf of the appellants, that, on the findings of the Jury, the verdict given ought to have been entered for the Company, as there was no obligation under contract to supply water; or, in the alternative, that it was subject to the term which entitled the Company to cut off the water if the condition under which it was supplied was violated. Mr. Waugh, K.C. (Mr. Compston with him), for the respondent, argued that there was evidence from which the Jury could infer that there was a continuing contract with the plaintiff that the hydrant should be charged with water, or that reasonable notice should have been given before discontinuing the supply, so that proper arrangements might have been made for providing storage.

At the close of the arguments by Counsel, their Lordships came to the conclusion that at the time the fire occurred there was no obligation on the part of the appellant Company to supply water; that the supply had been properly cut off; and, consequently, that the appeal ought to succeed. They further thought that this was a case in which they need not exercise their discretion by ordering a new trial, but that, upon the admitted facts of the case, judgment ought to be entered for the Company, with costs of the appeal and of the trial in the Court below.

Books and Papers of the Gowerton Gas Company.

Mr. Justice Joyce had before him last Tuesday a motion for judgment in the case of the *Gowerton and District Gas Company, Limited, v. Williams*—the defendant not having entered an appearance. Mr. O'Gorman, representing the Company, who carry on business at Gowerton, near Swansea, asked for an order for the return of all books, papers, and documents belonging to them, particularly the certificate of incorporation. His Lordship granted the order.

Receiver Appointed for the Amman Valley Company.

The motion by Messrs. R. & A. Main, Limited, for the appointment of a receiver of this Company, to which reference was made in the "JOURNAL" last week (p. 864), was renewed on Friday, before Mr. Justice Parker, when Mr. Owen Thompson, on behalf of the plaintiffs, produced a further affidavit to show that there were assets which it was necessary to preserve in the interest of the creditors. It appeared from it that there was certain plant and machinery, which had originally cost £10,000, and was estimated to be now worth £6000; installations had been made in certain houses in the district; and the Company owned a certain number of gas-stoves and other fittings. The Manager, who until recently had been looking after the property and living in a cottage in the neighbourhood, could no longer get his wages, and had discontinued his services; and prosecutions had taken place for stealing portions of the plant. Rates and taxes were due; and it was necessary that the property should be protected. He therefore asked for the appointment of Mr. A. S. Hutchins, a Chartered Accountant, with regard to whom he had an affidavit of fitness. His Lordship made the order as asked.

MISCELLANEOUS NEWS.

THE GASLIGHT AND COKE COMPANY'S BILL.

London County Council's Arrangement Sanctioned.

At the Meeting of the London County Council last Tuesday, the report of the Parliamentary Committee on the subject of the Bill of the Gaslight and Coke Company, given in the "JOURNAL" last week (p. 865), was presented.

Mr. FELIX CASSEL, K.C. (the Chairman of the Committee), having moved that the report be received,

Mr. W. C. JOHNSON referred to the arrangement arrived at with the Gaslight and Coke Company, whereby, in exchange for a reduction of 2 candles in the illuminating power of the gas, the price was put down by 1d., instead of, as in other cases previously arranged by former Councils, where the reduction was 1d. per candle power, and with 2 candles necessarily a reduction of 2d. There were advantages in coming to terms with the Company, instead of having to fight their Bill in Parliament; and the Council must remember that a great exception—a precedent—had been created which it would have been extremely difficult to persuade Parliament to make in their case. The first of the three London Gas Companies to come to Parliament was the South Metropolitan, and they, in exchange for this concession, with an increased possibility of earning dividends, consented to the whole of the terms that the Council now had in the Gaslight and Coke Company's Bill, and gave a reduction of 2d. instead of 1d. in the standard price. The Commercial Gas Company did the same. The Gaslight and Coke Company were possibly the worst of all; and only three or four years ago a meeting of the representatives of the Borough Councils was held at the County Hall on the subject of the high prices charged by them. Notwithstanding this, the Parliamentary Committee apparently had come to a bargain with the Company to let them off half the reduction that both the other Companies were willing to allow. The arrangement had been entered into by the Committee without the consent of the Council; and therefore they were bound to adhere to it. He, however, considered it would have been wiser on the part of the Committee to have first submitted the scheme to the Council, in order that they might have discussed the matter in public, and come to the arrangement in the open, and not with their eyes shut. He thought there was no case for giving to the Company what no other Company had had. Their records did not entitle them to this consideration; and he submitted that the Council had neglected their duty in failing to secure the reduction which was granted by the other two Companies. He moved, as an amendment, that the Committee's report be received, with the exception of the portion relating to the Gaslight and Coke Company's Bill.

Mr. W. A. CASSON seconded the amendment.

Mr. CASSEL agreed that it would have been more desirable to bring the question before the Council. The Committee would certainly have done so if they had been able; but at the time the agreement was arrived at the Bill was coming on in two days before a Select Committee of the House of Commons, so that the agreement had to be made then and there or not at all. It was impossible, under the exigencies of the case, for them to bring the matter before the Council. The agreement was certainly a most advantageous one, and had the full approval of all the officers and experts who advised the Committee. The only objection Mr. Johnson had raised was that the reduction, not in the selling price but in the standard, was only 1d. The Committee were advised by their experts that there could not be a saving to the Company of more than this; and surely it was not fair, when they were thus advised by their own witnesses, for them to ask for anything more than their officers pointed out could fairly and legitimately be applied for. To press for anything more would be simply asking for something which it was hopeless to expect to get. They had also obtained something which had never before been found in any Act of Parliament dealing with a gas company—a calorific standard. This was a most important consideration, now that gas was so largely used for heating and cooking purposes. Having obtained this concession from the Company, it was only reasonable that they should accept the whole of this very fair and equitable arrangement.

On a show of hands, only 15 members supported the amendment, which was defeated by a large majority. The report of the Committee was then approved.

CARRIAGE OF COAL TO THE BIRMINGHAM GAS-WORKS.

Corporation Allege Excessive Charges by Railway Companies.

The Railway and Canal Commissioners were engaged for several days last week hearing an application by the Corporation of Birmingham against the Midland, London and North-Western, and Great Western Railway Companies, for relief in respect of charges to and from their gas-works. The Corporation said certain rates charged by the Companies were in excess of the maximum, and therefore illegal; and they claimed that certain rebates should be allowed them, because they provided accommodation for coal at their works, and rendered certain services. There was also a claim against the North-Western Company that the charges for hire of waggons were excessive.

The Commissioners were Mr. Justice A. T. LAWRENCE, the Hon. A. E. GATHORNE-HARDY, and Sir JAMES WOODHOUSE; and the following were the Counsel engaged: Mr. BALFOUR BROWNE, K.C., Mr. FOOTE, K.C., and Mr. M'CARDIE, for the Corporation; Sir ALFRED CRIPPS, K.C., Mr. SIMON, K.C., Mr. M'CASSIE, Mr. H. RUSSELL, and Mr. J. B. ASPINALL, for the Railway Companies.

Mr. BALFOUR BROWNE, in opening the case, said the Corporation required relief in respect of charges made by the defendant Companies for traffic along their lines to and from the gas-works. The applicants said that certain rates now charged were in excess of the maximum, and therefore illegal; and that certain rebates should be allowed to the Corporation because they provided accommodation for coal at their works, and also rendered services to the defendants. There was also a claim against the London and North-Western Railway Company that they charged more for the hire of waggons than they were entitled to do under their orders. The Corporation supplied with gas an area of 114 square miles, with a population of 850,000; and the capital invested in their gas-works was about £3,000,000. They had five gas-works; but the present application referred to only four of them—viz., Saltley, Nechells, Windsor Street, and Swan Village. The inward traffic to the gas-works was equal to 650,000 tons a year; and 540,000 tons of it was coal. The outward traffic amounted to 120,000 tons a year, 100,000 tons of which was represented by coke. The Commissioners would see that on such an enormous traffic even 1d. overcharge meant an expenditure of some £3000 a year to the Corporation; so that, though they were dealing with small amounts, the aggregate was very great. The applicants complained that no allowance was made in the rates charged to them by reason of the large and regular quantities dispatched to and from their works, but that they had to pay precisely the same rates as those charged to casual and small merchants. Proceeding to deal with the case in detail, Counsel said the Saltley works covered 18 acres of ground, and some 200,000 tons of coal were carbonized every year. They were served by the Midland Railway Company. The applicants claimed a 3d. rebate from the Company, because they themselves provided accommodation at Lawley Street Station, and this rebate had already been allowed them by the North-Western Railway at Windsor Street for station services. A similar rebate was allowed the Wolverhampton Gas Company by the Great Western Company. The applicants' trucks made three journeys a month to the collieries, against 2·5 journeys per month by other traders; and, in spite of this extra trade, and the fact that the coal to the smaller traders had to be carted a mile farther, at a cost to the railways of one-sixth of a penny, they refused to make any rebate on the applicants' traffic. As against the London and North-Western Railway, the Corporation claimed 1d. rebate on the terminal services in respect of the coke traffic. At the Nechells works, served by the London and North-Western and Midland Companies, 100,000 tons of material were carbonized a year. There were sidings for both the Companies. The Midland were charging the Corporation for accommodation at a siding at Washwood Heath; and they said this was not right, as they preferred that the trucks should go through to their own sidings. The London and North-Western Company also refused to allow them a rebate of 3d. a ton which they allowed in respect of the Windsor Street works. They claimed adjustment of the rates; the Great Western Company being willing to give a retrospective reduction.

Mr. SIMON intimated that the London and North-Western Company were prepared to do likewise in respect of the rates for Swan Village.

The first witness called was

Mr. *G. Hampton Barber*, the Secretary to the Birmingham Gas Department, who said in 1905 he brought before his Committee the question of what he considered to be too high charges. On Dec. 30, he wrote a letter to each Company stating that the charges were paid under protest and without prejudice to any claim for damages on account of undue preference to firms who had been enabled to compete unduly with the Corporation. At the time he had no actual knowledge that the Companies were overcharging. He merely suspected that the charges were excessive. The Corporation got their coal from Derbyshire, Lancashire, and Nottinghamshire; about 60 per cent. being received during the winter months. The Saltley works were served by the Midland Railway Company; and the Lawley Street goods station was the nearest to the works.

Mr. FOOTE said since Feb. 25 the London and North-Western Railway had made a reduction of 3d. a ton so far as coal was concerned. On the traffic going to the Nechells works, they had made a further reduction; but whether this was for the sake of competition with the Midland Railway Company, he could not say.

Witness said there was no difficulty at the Saltley siding in dealing with the coal dispatched from the collieries. They had never received any complaint as to the way the Corporation had dealt with the trucks. The reduction of 3d. a ton desired in respect of terminal charges on coal coming to the gas-works from the Corporation siding was on account of the fact that the Railway Company rendered no services in the matter. The London and North-Western Railway Company served the Windsor Street and Nechells Gas-Works; allowing the Corporation a rebate of 3d. a ton on coal going to the Windsor Street works, and 6d. on coals for the Nechells works.

Justice LAWRENCE having expressed the hope that the case would be shortened as far as possible,

Mr. BALFOUR BROWNE said the Midland Railway Company and the Great Western Railway Company had admitted the accounts in regard to certain items.

Mr. SIMON observed that the real point that governed the matter was as much a difference of principle as it was a difference in calculation.

Mr. FOOTE mentioned that if they succeeded in this case they were entitled to recover for a period of six years, having commenced their proceedings within the year.

Witness, in cross-examination, said that all the coal traffic going to the Saltley and Nechells works from the Midland Railway came through the Washwood Heath siding. He was not aware of the alterations that had been made between 1896 and now, as he did not come on the scene till 1901. They had coals from two collieries at the Nechells works, and from four or five collieries at the Saltley works. He was not aware that the conditions of working on the Midland Railway had altered since 1896; but he thought the Company had saved money by the making of their new sidings. He did not know the cost of the conveyance and delivery of the coal to the Corporation; but he did think they proceeded on a very extravagant basis. One-third of the traffic came in the Corporation's own trucks. With reference to the Midland Company's treatment of the Corporation, he would like to point out that before the present proceedings the Corporation found that coke was being brought by the Midland Company from Nottingham to

Birmingham at 3s. 1d. a ton. This interfered with the Corporation trade; and he asked them to quote for the carriage of coke between these towns, and they quoted 4s. 10d. a ton. He had never complained to the Midland Company in regard to the overcharges; but he had mentioned the matter to the Company's representative. The main complaint against the Great Western Railway Company was in respect of rates on coal coming into, and coke going out of, the Swan Village works; but there was also a grievance in regard to the rates on bricks and retort material from the Congreve siding to Saltley, and other miscellaneous traffic in and out of Congreve siding. With regard to the terminal services rendered by the Railway Company, it was the case that any coal coming from the south to Swan Village works had to be run along the branch as far as the West Bromwich station before it could be shunted back over the cross-over road on to the up-line, and so to the gas-works sidings; but at the time the Company's answer to the Corporation's pleadings was put in, the whole of the coal going to Swan Village came from the contrary direction, so that it could easily be backed into the gas-works. The coal came from North Wales and the Aldridge Colliery. At the time of their application, they said they received coal from Derbyshire, Yorkshire, and Stafford; but the coal came through Birmingham from the south. Replying to questions on the subject of rates on coke outward from the works, witness said he had made no complaint on the subject up to December, 1905, when he sent a letter to all the Companies in respect of rates on traffic generally. Asked whether it was not a fact that the whole of the coke rates as they affected the Swan Village works were a matter of only about £10 a year, witness replied that he had not worked it out. His attention had been more particularly directed to the rates on coke by the fact that competition coke was being sent from Nottingham to Birmingham at 3s. 1d. a ton, and, when he asked for a rate from Birmingham to Nottingham, he could not get a lower one than 4s. 8d.

Re-examined by Mr. BALFOUR BROWNE, witness said that though the terminal charges for coal were only 3d. a ton, on some classes of goods they ranged from 6d. to 1s. 6d.; and the application of the Corporation was that the whole of them should be remitted where maximum charges were made, and a due proportion where the rates were below the maximum. The Corporation were frequently charged by the Railway Company for cartage when there was actually no cartage performed.

Justice LAWRENCE observed that this was one of the questions which he had suggested might be settled without the aid of the Court.

Mr. SIMON said the Railway Companies were willing to make a rebate on the amount of any cartage charges made where no service was rendered.

Mr. BALFOUR BROWNE replied that this was enough.

Mr. SIMON said the Companies had many rates, and could not always tell if cartage was included; but where the fact was pointed out, the cartage charge would be deducted.

Mr. BALFOUR BROWNE: I make no suggestion that there is bad faith on the part of the Companies.

Mr. *F. J. Bywater*, the Engineer-in-Charge at the Saltley works, said that for the last few years there had been a tendency to increase the consumption of coal, which now amounted to 210,000 tons a year. The average number of waggons of coal was 77 per day. The coke-waggons came in each day, and would be about 56 in the winter and 33 in the summer. There were three sidings belonging to the Corporation—one an independent one. It was on the Midland Company's initiative that the coal was sent on to the independent siding. He never asked them to send coal, except when there was no coal on the Corporation's reception line. The reception line was cleared every three or four hours. They received a definite quantity of coal each day. With regard to coke, 50,000 tons went over the Company's lines in 1908, but this was not the total output, as a great deal went by canal-boat. There was no necessity to have the coal in in any order. They had it in weekly quantities; and he had never asked the Company to deliver trucks in any particular order.

Mr. M'CASSIE: Are you in a position to take a full train load to Saltley when offered to you by the Company?

Witness: Whenever they have offered it in a convenient manner and as a request, we have always taken it. He added that the Railway Company suited their own convenience when bringing the coal down; and it might not be convenient for the Corporation to take the coal at any time just to suit the exigencies of their traffic. The line was busy; and it was impossible at certain hours for traffic to come down. Therefore it was unjust to think that coal might be transported to them at any time by the Railway Company.

Mr. M'CASSIE: The point I wish to know is whether you are in a position to take a full train-load at Saltley when offered by the Midland Railway Company?

Witness: I think so, if presented at a reasonable time, proportionate to our traffic—say, every three or four hours. If you say: "Can we receive every hour or at any hour of the day?" I say "No." We never "whistle" for coal unless absolutely standing for it.

Justice LAWRENCE: I understand that is rare, because most frequently you have sufficient coal in your reception siding?

Witness: Yes. He added that during the last twelve months they had not had much cause for complaint that they had not had coal on the reception siding. The supply of coal to the works was regular, coming daily according to the quantities ordered. The Corporation had never had to notify the collieries not to send more because the Railway Company's sidings were congested. They had, as a rule, been able to receive full train-loads as the Company offered. The Company's full train-load was generally 25 trucks.

Justice LAWRENCE: You will have to go very thoroughly into this to satisfy me you can take coal at Saltley in full train-loads.

Mr. *Walter Chaney*, the Engineer-in-Charge of the Nechells works, said they were served by the Midland and London and North-Western Railways; and the amount of coal coming into the works was 141,000 tons. The capacity of the works might, however, be doubled. It was not correct to say that shunting was done to particular sidings at the request of the Corporation. It was entirely at the pleasure of the Railway Company. In regard to obtaining empty waggons for coke traffic, the practice was to ask the foreman to put them in; but no time was stipulated as to when this should be done. As a rule, they gave notice once a day asking for a certain number of trucks; and they were put in at the Company's option. The Corporation had ample siding accommodation at their works.

Sir A. CRIPPS remarked that there was no difference between the Corporation and the London and North-Western Railway Company as to in-coming traffic. It was only in regard to outward coke traffic.

Mr. BALFOUR BROWNE said the Company were allowing a rebate of 3d. per ton on coal; but there was a dispute as to the other traffic, and he wished to know how the traffic was worked.

Cross-examined by Sir A. CRIPPS, witness said that working had gone on quite quietly between the Corporation and the Midland Railway Company's officials; but at times they had had trouble to obtain coal. All the Corporation traffic was promptly dealt with; but he could not say the Midland Company dealt with it so promptly as did the Corporation officials. As to shunting, he thought the Railway Company might make better arrangements for bringing the coals to Nechells.

Several other witnesses gave evidence before the close of the case for the Corporation. The foreman shunter at the Saltley works said he had never known of any request to the Midland Railway Company for the delivery of coal in any special order. The foreman shunter at the Nechells works said they left it to the discretion of the Railway Company to bring coal up from the Duddeston Mills siding, where it was first placed; and the Company did the work at their own convenience. Evidence was also given, as to the Swan Village works, that the Great Western Railway Company could send in full train-loads; and yet they had sued for charges.

Sir ALFRED CRIPPS then opened the case for the Railway Companies. He pointed out that, there being three sets of actions, they had been wandering rather in a wilderness of evidence; but he would at the outset deal with the question of principle involved. In regard to the coal traffic, the first allegation made against the Midland Railway Company and the Great Western Company was that, in some way or other, they charged for services and station accommodation which they had not provided. The second allegation applied to the three Companies, and was that in their rates they had included terminal charges at the forwarding end when no service or accommodation was afforded. He submitted that the rate charged the Corporation by the Midland Company was perfectly legal and legitimate. It was a charge which worked out at two-thirds of the maximum rate for the conveyance, and was made outside any question of terminal charges. Terminal charges were not made upon the Corporation under the cover of conveyance charges. He argued that the Corporation had not proved terminal charges; and if the Railway Companies had charged for sidings, the question was not one for that Court, but for arbitration. After citing numerous cases, he submitted that the Court must be satisfied, either by direct proof or by inference, that a terminal charge was included in the rate, before they could make any rebate. There was also authority for the contention that, even were the terminal charge made in respect of which no service was rendered, the Court was not bound to give a rebate. This, as he understood, applied to cases where equivalent services other than terminal were given. All three Companies were concerned in the 1d. rebate asked for on coke outward. He admitted that the Companies had been charging more than they were entitled to charge in this respect; but when it was brought to their notice, they reduced the charges to such a level as was justified, including the 1d. He admitted, further, that, in so far as the Companies had made illegal charges, the Corporation were entitled to an account for six years back.

Mr. *John Thompson*, Depôt Master and Traffic Inspector of the Midland Railway, gave evidence for the defence, as to the means adopted to get trucks of coal for the Corporation into Nechells and Saltley. He said he had frequently to order Corporation coal traffic to be held up because the Corporation had no room to receive it, and had complained to the Corporation on this ground. There were 350 trains a day over the main line, across which the traffic at Saltley had to be taken. At Duddeston Junction, for five days a week, from 8 p.m. until midnight, an engine was reserved for the use of the Corporation.

Mr. MACASSEY: Did you ever find it necessary to hold back Corporation traffic at points on the journey to Washwood Heath?

Witness: Yes, very frequently; and the cause is that the gas-works do not take the traffic in as it arrives. They have not the accommodation. He added that he had on several occasions complained that the Corporation traffic was blocking the sidings.

Cross-examined, witness said he did not know that the Corporation paid the Midland Railway Company the sum of £80,000 a year in respect of their traffic.

Mr. *John Elliott*, Superintendent of the Line of the Midland Railway, said the Corporation could not accept the coal as it arrived; and the Company had to provide siding accommodation for it.

The hearing was then adjourned until yesterday (Monday).

Diminished Leakage from Halifax Reservoirs.—The Water Committee of the Halifax Corporation have received a report from the Engineers of the Walshaw Dean reservoirs stating that the grouting with liquid cement has considerably reduced the leakage. Last March, with the water at 10 feet from the top level, the escape of water from the bottom reservoir was 800,000 gallons per day; whereas now it is only 3700 gallons. The grouting process is to be continued.

Failure of Electric Lighting in Norwood District.—Last Friday evening, those tradesmen in the Norwood Road from Tulse Hill to West Norwood who have had their shops fitted with electricity, and have not retained gas, found business much disturbed by the failure of the electric light, and by having to conduct it by the feeble rays of the humble—but still useful auxiliary to electricity—candle. The shops in which gas is used continued business without interruption; the occupiers, in fact, so far as lighting is concerned, have no experience of the inconvenience of the sudden collapse of the illuminating agent. Certain shopkeepers, with both gas and electricity, patted themselves on their backs for their foresight in retaining the older illuminant. But in other quarters there were not a few words used which it would not be becoming to reproduce.

ASSOCIATION OF MUNICIPAL CORPORATIONS.

Annual Meeting in London.

The Annual Meeting of the Association was held last Friday, in the Council Chamber of the Guildhall, when there was a large attendance of representatives from both county and non-county boroughs. At the opening of the proceedings, the chair was occupied by the Lord Mayor Alderman Sir George W. Truscott), who proposed the re-election as President of Mr. J. Harmood-Banner, M.P., of the Liverpool Corporation—a suggestion which was cordially agreed to by all those present. Mr. HARMOOD-BANNER thereupon took the chair.

CONSTITUTION OF THE COUNCIL.

The VICE-PRESIDENT (Mr. A. H. SCOTT, M.P.) proposed that an alteration be made in the rules of the Association so as to give Irish boroughs representation on the Council. He said the Law Committee had gone carefully into this question; and they thought it best that the boroughs of Ireland should come in under the same arrangement as existed for the boroughs of London—that was, that three boroughs should have one representative. They already had the three largest towns of Ireland represented in the Association; and by agreeing to his proposal, it was hoped to increase this representation.

The CITY SOLICITOR (Sir Homewood Crawford) seconded the motion; and it was agreed to.

The TOWN CLERK OF LIVERPOOL moved an alteration of the rules, so as to make the Municipal Law Committee consist of twenty town clerks, nine representing county boroughs, nine non-county boroughs, and two metropolitan boroughs. This, he pointed out, meant an addition of two members to the Committee—one each for county and non-county boroughs.

The MAYOR OF LONGTON seconded the proposition.

The TOWN CLERK OF SHEFFIELD expressed the opinion that the whole question of the constitution of the Law Committee demanded the attention of the Association.

The TOWN CLERK OF WOLVERHAMPTON thought the Association should have more information before them to enable them to decide whether it was desirable to alter the constitution of the Committee. He therefore moved as an amendment: "That the subject be referred to the Council for consideration and report to the next meeting of the Association."

The amendment having been carried,

The TOWN CLERK OF LIVERPOOL suggested the advisability of the amendment being worded: "That the subject be referred to the Council with instructions to consider the constitution and method of election of members of the Law Committee, and that they report thereon to the next meeting of the Association." This would enable the Council to go properly into the whole subject.

The CITY SOLICITOR appealed to the mover of the amendment to accept the proposition.

The TOWN CLERK OF WOLVERHAMPTON said what he objected to was the Law Committee being increased that day. This having been prevented, he was quite willing that the proposed words should be added to the amendment.

THE QUESTION OF SINKING FUNDS.

In the course of their report, the Council remarked that a considerable amount of interest and public agitation arose in the early part of last session with reference to several Local Bills proposing to confer on the local authority power to apply moneys standing to the credit of a sinking fund, instead of creating a new loan. Communications passed between the Secretary of the London Stock Exchange and the Secretary of the Association; and the former was invited to attend a meeting of the Law Committee. He did so; and after a full discussion the Law Committee agreed to the following recommendation, which it was understood would meet the requirements of the Stock Exchange: "That a statement be furnished to the Stock Exchange by local authorities containing the following particulars: (1) Amount of the sinking fund at the beginning of the year. (2) Amount contributed to the fund during the year. (3) Amount taken out for extinction and the purchase of stock during the year. (4) Amount remaining in the sinking fund at the end of the year (*a*) invested, and (*b*) uninvested. (5) That a copy of every Bill when deposited containing financial clauses be forwarded to the Secretary of the Stock Exchange." The question was not, however, allowed to rest just there; for several Bills containing the power in question were stopped in the House of Commons. Ultimately, the President of the Local Government Board consented to receive a small deputation to discuss the propriety of the proposed power. The question was shortly afterwards referred to in the House of Commons, when it was suggested on behalf of the Local Government Board that the question was one which should be referred to a Committee; and on this understanding the Bills were allowed to proceed with the sinking fund clauses. In the autumn session a Select Committee of the House of Commons was appointed, to inquire into the application of sinking funds in the exercise of borrowing powers. The first witness was Mr. J. A. E. Dickinson, of the Local Government Board, who explained very fully the various modes adopted by local authorities in raising their loans, and particularly described the mode and effect of the provisions empowering local authorities to use the sinking and redemption funds for purposes for which authorities had borrowing power. He also pointed out that this power had been in operation in London and other towns for many years, and that the stock regulations of the Local Government Board had been amended expressly to give this power. The session terminated before the proceedings of the Committee were completed. The Committee would, however, probably be re-appointed, when witnesses on behalf of the Association would be tendered.

THE MUNICIPAL OUTLOOK.

The PRESIDENT, in moving the adoption of the report of the Council and the statement of accounts, made a few remarks on the affairs of the Association, and on subjects of particular interest to the members. He said that the accounts were satisfactory, though the balance was reduced; and the expenditure was of a very businesslike character, without any trimmings. If the Local Government Board Auditor disallowed the subscription of any borough towards the work of the Association, he would, in his (the President's) opinion, be adopting a course which was a direct interference with the great administrative assistance from time to time rendered to the Local Government Board on all matters appertaining to their work, by the mayors, representatives, and town clerks, who gave their ability and experience in local matters, or matters affecting the health, comfort, and convenience of the people, upon the Council and Committees of the Association. He had hoped to have announced the confirmation by the President of the Local Government Board of Mr. Long's assurance that the disallowance in the case of the London boroughs would be overridden; but unfortunately he had not yet been successful in the appeal he had made. Speaking of parliamentary work, he said they had been able—he thought most successfully—to repel the attacks made on such forms of municipal trading as had yet been adopted, and also to reply satisfactorily to the criticisms made on methods of municipal finance. But they were helpless as regarded the increased duties, and consequent expenditure imposed on them solely by the numerous Acts of Parliament rightly passed for the social amelioration of the times. For instance, the contemplating of an extension of the Old-Age Pensions Act was suggested as conditional on a contribution from poor and local rates. He then proceeded to enumerate the directions in which additional burdens were being placed on municipal authorities, and said in this respect the question of the unemployed was of special interest to the Association. A total of £300,000 was the Imperial contribution to this question; while that of local authorities was to be in millions. True, it was expended in works, duly authorized and applied for, and no doubt required; but it was admitted that many of the works at least were neither due nor of immediate necessity, and that a well-governed community, under no pressure, and with a proper regard to its financial status and abilities, would have postponed expenditure until a more convenient season. Under pressure, then, work was authorized by the Local Government Board, and almost, he might say, insisted upon, which defrauded the worker in the future of rights of labour, and imposed burdens on the present ratepayers in a most inconvenient way. As to the taxation or rating of ground values, they did not all agree with this; but they heard a whisper of its coming, and he wanted to say, "Watch it carefully, and preserve it for the source from which it proceeds—municipal improvement and expenditure. It is the only asset I can see to relieve the rates." The paragraph in the report relating to sinking funds required notice, as during the last session of Parliament a serious attack was made upon two at least of the municipalities in connection with clauses which they had inserted in Local Acts in relation to the application of sinking funds. Wolverhampton withdrew the clause, so as to prevent any difficulty in the passing of the Act; but, on the other hand, Widnes obtained the clause under certain promises as regarded a general consideration and discussion of the question of sinking funds. The subject had been made an opportunity for an attack on municipal finance; and he was sure that they were all ready—as he himself was—to meet the enemy and discuss the question in the most thorough manner possible, so as to uphold the financial credit which the municipalities had so long and deservedly enjoyed. The President of the Local Government Board consented to the appointment of a Committee, of which he (the speaker) was a member, and which had been hearing evidence on both sides of the question relating to the application of sinking funds and all matters appertaining thereto. As a member, it would not be right for him to refer to the evidence or proceedings of the Committee; but he should like to recognize the fact that the Association had, through the Town Clerks of Wolverhampton and Widnes and the Treasurers of Birmingham and Brighton, given most useful evidence to the Committee. After referring at some length to the majority report of the recent Royal Commission on the Poor Laws, he said that a large part of the new duties and finances would fall on the county boroughs; and with these expenses must be included a better system of valuation and assessment, and a simplified collection of rates.

The VICE-PRESIDENT (Mr. A. H. Scott, M.P.), in seconding, remarked that it was suggested that the Chancellor of the Exchequer might look to ground values for getting some of the money he needed. If such a tax were to be raised, there would be considerable dissatisfaction among municipalities if a good deal of it was not handed over to the local authorities, in consequence of the great additional expenses that had of late years been placed upon them.

The report and accounts were adopted; and the meeting then proceeded to consider a number of other items on the *agenda*.

COST OF PRIVATE BILL LEGISLATION.

On the proposition of the TOWN CLERK OF WOLVERHAMPTON, seconded by the TOWN CLERK OF BLACKPOOL, a resolution was unanimously passed: "That it be humbly represented to Parliament, as the respectful opinion of this Association that, before pressure is brought to bear upon local authorities to induce them to consolidate and, where necessary, amend their Local Acts (as recommended by the special report of the Police and Sanitary Committee of the House of Commons dated July 24, 1908), it is desirable in the public interest, and especially also in view of the heavy financial burdens now falling upon ratepayers, that steps should be taken (*a*) to materially lessen the cost of Private Bill legislation, (*b*) to effect the consolidation and mendment of the Public Health Acts, and (*c*) to extend the Provisional Order system in accordance with previous recommendations of Special Committees of the House of Commons."

Before the meeting concluded, a hearty vote of thanks was passed to the President for his conduct in the chair.

For the third time, the inhabitants of the village of Balderton have failed, on a poll, to vote in sufficient numbers in favour of lighting the streets to get a gas scheme adopted. The village is close to Newark, from which place it was proposed that the gas-mains should be extended. Of those who voted, a substantial majority were in favour of the scheme; but the necessary approval of two-thirds of the parishioners was not secured.

SAN PAULO GAS COMPANY, LIMITED.

Good Increase in Business.

The Annual General Meeting of the Company was held last Friday, at the Great Eastern Hotel, Bishopsgate Street, E.C.—Mr. D. M. Fox in the chair.

The SECRETARY (Mr. G. H. Rogers) read the notice convening the meeting; and the Directors' report and the statement of accounts were taken as read.

The CHAIRMAN, in moving their adoption, said it was again his privilege to congratulate the shareholders on the continuously increasing prosperity of their undertaking; for, as the report and accounts showed, progress had been made during the past year in every branch of the Company's business, and this notwithstanding a certain perturbation in the agricultural, industrial, and commercial affairs of the State, caused, in the first instance, by over-production of coffee and over-trading, and by the exceptional financial expedients resorted to by the State Government. Exchange had kept steady at about 15½d. Turning to the statement of accounts, it would be seen that the gross receipts for the past year amounted to £169,551—an increase of £17,151, or about 12 per cent. over those in the previous year. The working expenses, including London charges, depreciation, &c., and sundry exceptional expenses, were £129,979, or £14,502 more than in 1907. The profit on working for the year was therefore £39,572, against £36 924 in 1907; being an increase of £2648, or 7 per cent. more. After adding to this profit £5603 brought forward from 1907, and £840 dividends on investments, and deducting the charges for debenture interest and redemption, for stamp duty on new capital, and the interim dividend on the ordinary shares, there remained a balance at disposal of £30,871. This enabled the Board, after paying the dividend on the preference shares, transferring £5000 to the reserve fund, and writing £5000 off the cost of the new gasholder, to recommend a further dividend of 5 per cent. (making 8 per cent. for the year, free of income-tax), and to carry forward £6539, or £936 more than was brought in. He might here remind the shareholders that the current year would have to bear the full twelve months' dividend on the new 6 per cent. preference shares —viz., £3750. The consumption of gas in public lighting increased by 8 per cent.; and at the end of the past year was approaching 2 million cubic metres—the minimum specified in the contract dated March 5, 1908, which was fully explained at the last meeting. The working of this new contract had been satisfactory in all respects, resulting in orders for new lamps from the Government, which, under the old conditions, would probably not have been given. The private consumption for all purposes was 12 per cent. in excess of that in 1907. The principal advance had been made in the supply of gas for stoves, motors, &c.; the increase in this department having been no less than 31 per cent. over 1907. The consumption for private lighting was 7 per cent. over that in 1907; so that, in spite of a more active competition from electricity, they were more than holding their own. The receipts from the sale of coke and tar had been excellent, showing an increase, as compared with 1907, of £5223. It was noteworthy that these residuals had produced 67 to 70 per cent. of the cost of the coal carbonized. It was doubtful, however, whether such good results would be permanently maintained. Turning to the expenses, the cost of coal, oil, &c., showed an increase of £8819, owing to 3853 tons more coal having been carbonized at a higher price per ton of about 1s. 6d. in San Paulo. The difference in price would have been larger, but for a reduction in freights during the year. Wages, repairs, and maintenance exhibited considerable increases; and the additional number of public lamps had caused a larger cost, principally in lamplighters' wages. Turning to the balance-sheet (which, he thought, presented very plainly the strong and sound financial position of the Company), the expenditure on capital account during the year was £54,332. Of this sum, about £40,000 represented the cost of the new gasholder and new mains; and the remainder was made up by cost of lamps, meters, &c., and purchase of land. The development of the manufacturing plant continued to occupy the attention of the Board. The original site of the works—amply large enough when bought some forty years ago—was now very crowded; and as it was bounded on three sides by streets, it could not be extended. It had been necessary to transfer the purifying plant, station meters, and governors to land almost adjoining, in order to make room on the old site for coal-stores, &c. The Company had also agreed to substitute mechanical for animal traction on its tramway connecting the gas-works with the San Paulo Railway depôt, and to relay the line with grooved rails, and provide improved rolling stock. There was therefore further expenditure in view, of which a good part, however, was in the nature of renewals, and would not be placed to capital account. Here he might emphasize the determination of the Board to keep down the capital expenditure as much as possible, consistently with the exigencies of the progressive increase of the Company's business. On the other side, the new issue of 6 per cent. preference shares added £62,500 to the capital, bringing the total amount issued, with debentures, up to £437,500. The reserve fund, with the proposed addition of £5000, would amount to £60,000. Investments amounting to £23,653 were held as against a part of this account; and the Board hoped to add to these investments as opportunity offered. The remaining liabilities called for no particular mention. He was glad to say that the working of the supplementary contract signed on March 6 last year, the scope of which he fully explained at the last annual meeting, had been quite up to expectations. It would interest the shareholders to know that had this contract not been signed, the price of gas must have been reduced from 140 Rs. gold, to 133⅓ Rs. gold as from January, 1909. It was worthy of note that, in virtue of this latest contract, the minimum consumption of gas in the public lamps was raised from 1½ to 2 million cubic metres, and that the Company had received orders for fixing lamps, which would bring the consumption to above 2 million cubic metres. As was expected, the cancelling of the indemnity clause had induced the Government to order extensions of the public light service with greater freedom. A contract had been entered into with the Camara Municipal for the conversion of the system of traction on the Pary Tramway from animal to mechanical traction, with certain improvements in the track and rolling stock. In addition to improved and more economical service, this contract had had the effect of removing all question of the Company's rights to the tramway, which directly connected the works with the goods-yard of the San Paulo Railway. It was with the greatest satisfaction he had to record that the relations of the Company with the Government and the Camara Municipal continued to be of the most friendly nature. Of course, the Company were working under vigilant Government inspection; and it was infinitely to the credit of the Manager and technical staff, and indeed of all the employees, that the fines for the past year were under £2! He had again to bear testimony to the ability and zeal of their popular Manager (Mr. Richard Gray); and before the meeting closed, he should have the pleasure of proposing a hearty vote of thanks to him and to their Engineer (Mr. Whyte), and to the staff in San Paulo. He did not intend to allude to the competition to which they were subject from electricity. In this the Company were only like every gas company in all parts of the world; and what was the use of complaining about it? As the shareholders knew, the Directors had done all in their power to combat this competition; and with what success the shareholders were made aware year by year as they received the reports of continuously increasing prosperity. But a paragraph which appeared in the "Times" of March 23, which no doubt most of the shareholders had seen, appeared to call for some explanation on his part. In the course of the paragraph, it was stated:

> The Prefect of the city of San Paulo has granted authorization to a very enterprising national firm of contractors and electrical engineers domiciled in Rio de Janeiro, San Paulo, and Bahia, and representing the General Electric Company of New York, to establish a service of electric power and light in the city to compete with the San Paulo Tramway, Light, and Power Company, Limited, on condition that the plan for laying down the subterranean plant shall be presented within four months. . . . The San Paulo Tramway, Light, and Power Company, has already one serious competitor in the San Paulo Gas Company—an English concern, providing a splendid service of public and private illumination, which, it must be confessed, dates from the establishment of the Canadian Company. Healthy competition has since then kept both Companies up to the mark, and the new enterprise will certainly bring down the price for electric power applied to all purposes.

In their own contract of 1897, the Gas Company had certain rights as to the supply of electricity; and this being so, the attentions of the Light and Power Company—the present competitors—and of "the enterprising firm of contractors and electrical engineers" (who were disposed to compete with the Lighting and Power Company) were quite embarrassing. Both parties seemed to attach some importance to their relations with the Gas Company; and this was very satisfactory and complimentary. However, in 1897, provision was made in the Company's contract for the supply of electricity; but they were not granted a monopoly, though they tried hard to get the power into their hands. The refusal was quite natural from the point of view of the Government and of the public. A clause was, however, put into the contract giving them almost a preference in the matter of electric lighting. As a matter of fact, when electric lighting seemed to become possible, they did contract for a small installation; but they soon found the conditions of electricity supply in San Paulo were such—there being no freedom from competition—that it would have been dangerous for them to enter into a large contract. The best thing, therefore, was, they thought, to improve the gas supply in every possible way; and they actually paid £2000 to be out of the contract for supplying the one installation. He was glad they did this. The results that had since been put before the shareholders year after year showed that the policy adopted was the right one.

Mr. A. F. PHILLIPS seconded the motion, which was unanimously carried.

Moved by the CHAIRMAN, and seconded by Major H. N. WEBB, a dividend was declared on the preference shares at the rate of 6 per cent. per annum, less tax, for the seven months ending Dec. 31 last, calculated from the dates the instalments were paid; and subsequently, on the motion of the CHAIRMAN, seconded by Mr. A. M'KERROW, a dividend of 5 per cent. on the ordinary shares was declared, free of tax, making 8 per cent. for the year.

Proposed by the CHAIRMAN, and seconded by Mr. A. F. PHILLIPS, Mr. M'Kerrow was re-elected to his seat at the Board; and on the motion of Mr. BARREYMAN, seconded by Mr. F. W. CHURCH, the Auditors (Messrs. Cash, Stone, and Co.) were also re-appointed.

The CHAIRMAN, in accordance with the remarks in his opening address, moved a vote of thanks to the Manager, Engineer, and staff in San Paulo. He eulogized their services, and also spoke of the diligence, and assistance to the Board, of the Secretary (Mr. Rogers).

Mr. LIDGERWOOD seconded the motion; and it was cordially agreed to.

Mr. A. W. OKE next proposed, and Dr. STRAIN seconded, a resolution thanking the Chairman and his colleagues for their services.

This was heartily carried; and the Chairman's acknowledgment concluded the proceedings.

OTTOMAN GAS COMPANY, LIMITED.

An Advantage of Black Sea Coal.

The Ordinary General Meeting of the Company was held on Tuesday last, at the London Offices, No. 9, Queen Street Place, E.C.—Mr. STEPHENSON R. CLARKE in the chair.

The SECRETARY (Mr. Thomas Guyatt) read the notice convening the meeting, together with the Auditors' certificate and the minutes of the previous meeting; and the Directors' report and the statement of accounts (which were noticed in the "JOURNAL" for the 16th inst., p. 807) were taken as read.

The CHAIRMAN, on rising to move the adoption of the report and accounts, said they would all hear with the greatest regret that Col. Daniell had been prevented from presiding over the meeting that day by the mandate of his doctor, who had ordered him to the South of France. He had, however, derived great benefit from the change; and he (the speaker) hoped that at their next half-yearly meeting they might see him in his accustomed place. With regard to the business

now before them, he thought they had every reason to be satisfied with the half-year's results. The balance-sheet gave a clear account of how much they had earned and expended. The shareholders would see that there had been a considerable increase during the twelve months in the reserve and amortizement accounts. These had not been fully invested in securities, as a portion was used some years ago to redeem £9000 of debentures; and they had now a considerable sum at their bankers on deposit, with the view of redeeming the balance of the debentures at the end of the half year. They had also written £1500 off plant. Turning to the revenue account, the first item was coals. The cost of coals during the past half year was a little more than in the corresponding period of 1907. They had come to the end of their cheap contracts; but though coal was somewhat dearer, it had not been excessively so. As the shareholders were no doubt aware, the largest proportion of the Company's coal supplies now came from the Black Sea; and they had made an interesting discovery with regard to these coals—namely, that they packed well into the retorts, with the result that it was possible to obtain a larger yield per mouthpiece. During the past winter they had had seven beds in reserve, capable of producing 250,000 cubic feet per day; and they would not therefore require to build any more retorts for the present. On the other side, they would see that there was an increase of £1500 in the gas-rental. They had obtained 353 new consumers during the six months under review. Early in the half year the Company were threatened with some labour troubles. These had, however, been very tactfully dealt with by Mr. John Gandon, their Engineer and Manager; and the Directors believed that they had come to an arrangement that would be satisfactory to all parties. Their colleague Mr. H. Ward Andrews had only just returned from a visit to Smyrna. He was much pleased with his inspection of the works, and had given the Board a most interesting report on the Company's property.

Mr. H. Ward Andrews seconded the motion; and it was at once carried unanimously.

On the proposition of the Chairman, which was seconded by Mr. A. M. Paddon, dividends were declared for the half year ended Dec. 31 at the rate of 7 per cent. per annum, less income-tax, on the preference shares, and at the rate of 8 per cent. per annum, free of income-tax, on the ordinary shares.

On the motion of the Chairman, seconded by Mr. Andrews, the retiring Director (Mr. A. M. Paddon) was re-elected; and on the proposition of Mr. F. C. Collingwood, seconded by Mr. W. T. Clarke, the Auditors (Messrs. T. H. Cocke and A. W. Cooper) were also re-appointed.

The Chairman proposed a vote of thanks to the Engineer and staff in Smyrna, and to their Secretary, Mr. Guyatt. It was, he remarked, always a pleasure to be able to propose a vote of this character when the work had been done as well as was the case with their Company. In the period under review, for the first time in his recollection, they had had a taste of what were called "labour troubles." Recently, difficulties of this character had been very severe in the Turkish Empire; and he thought that Mr. Gandon had made for the Company an extremely satisfactory arrangement. It was true that they paid a certain amount more to the men; but, on the other hand, they were working exceedingly well—better than they ever had before.

Mr. Paddon, in seconding, referred to the exceptional merits of the staff. They thoroughly deserved the recognition and encouragement the shareholders accorded to them by this vote.

The vote was heartily carried; and it was acknowledged by Mr. Guyatt on behalf of Mr. Gandon and himself, and their staffs.

Mr. A. W. Oke proposed a vote of thanks to the Chairman and Directors; remarking that the Company had been managed with considerable skill by the Board, and the shareholders were now reaping the benefit of the care and attention which had been paid to the business in past years.

Mr. W. H. Daun seconded the vote; and with its acknowledgment by the Chairman the meeting concluded.

TORQUAY GAS COMPANY.

Jubilee Meeting—Bonus to Employees.

The Annual Meeting of the Torquay Gas Company, held last Tuesday under the presidency of Mr. John Kitson, the Chairman, was the Jubilee meeting in connection with the undertaking.

The report and statement of accounts for the year showed a balance of £10,929 to the credit of the profit and loss account; and the Directors recommended, after allowing for the interim dividend paid in October, the declaration of the full year's dividends of 10 and 7 per cent. on the respective classes of shares. The Directors stated that there had been a continued increase in the sales of gas, and the new purifiers and the apparatus for the manufacture of sulphate of ammonia had proved satisfactory. An oil-gas plant had been erected, and the buildings and machinery at the works and also the mains had been kept in good order and repair.

The Chairman, in moving the adoption of the report and accounts, mentioned that this was the fiftieth anniversary of the starting of the Company; and he congratulated the shareholders on another successful year's working—the sale of gas having increased by nearly 6 million cubic feet. To assist in meeting the cost of the additional plant erected at the works, 200 of the 500 new 7 per cent. shares were sold, and realized an average price of £16 15s. 6d., thereby adding to the premiums received £1342, and making the total capital £113,529. The cost of coal, oil, and coke was £16,384, against £15,321, or £1527 more. This was explained partly by the extra quantity of gas made and sold, and partly by the higher price charged for coal. New purifiers were erected, and had been in use for nine months, and a saving of £390 had been effected thereby. Repairs and maintenance of works, though costing £1200 less, still appeared high; but with the alterations and extensions, now nearly completed, it was hoped there would be a still further reduction in the current year's working. In regard to the repair and maintenance of services, the expenditure had fallen from £1198 to £789; the heavy demands in the former year having been incurred principally through the introduction of the tramways and by the relaying of mains. The total expenditure under the revenue account was £31,343, against £31,808; and the balance of £6145 carried to the profit and loss account in 1908 contrasted very favourably with that of £3988 in the preceding year. The sales of gas stood at £25,936, compared with £24,082—an increase of £1854. Of this amount, £1000 was due to the extra charge of 2d. per 1000 cubic feet; but £854 had been obtained by the additional quantity sold. There was also an increase of £115 on rental of meters, prepayment fittings, and cooking-stoves. The total receipts showed the result of £37,758, against £35,796. Though this was the fiftieth anniversary of the Company, gas was first introduced in Torquay 75 years ago. The price then was 12s. 6d. per 1000 cubic feet, which was reduced in 1846 to 10s., and in 1850 to 8s. The foundation stone of the present gas-works at Hollacombe was laid on July 28, 1860; and in that year the price was fixed at 5s. 6d. per 1000 cubic feet. In 1861, there were 35 shareholders in the Company; and of these he was the only survivor. In 1870, there were 56 shareholders; and of these, he and Mr. W. B. Beynon, the Vice-Chairman, were the only survivors. By 1880, the number of shareholders had increased to 113; in 1890, there were 239; in 1900, 351; and in 1909, 356. The dividends had always been paid, and from time to time there had been many reductions in the price of gas. In connection with the jubilee, the Directors contemplated presenting the officials and employees with a bonus in recognition of their services. The Company now had to compete with the electric light. Still, there seemed no question that progressive gas companies could take their stand against any competing light that could be produced. Gas engineers and managers were alive to the necessity of meeting the competition by fresh improvements and ideas; and when it was remembered that, by the improved methods of burning, 1000-candle power or more of gas light per hour could be produced for 2d., gas shareholders need not feel much alarm as to what their opponents could achieve. The gas business must continue to develop, and the Directors of the Company, in the future as in the past, would do their best to follow a liberal policy, and thereby endeavour to promote alike the interests of the shareholders and of the consumers. They would have been glad to make a reduction in the price of gas; but looking at the trouble in the labour market and the state of things generally, it seemed to the Directors desirable to defer any alteration at present.

Mr. W. W. Cox seconded.

Mr. G. N. Luxmore congratulated Mr. Kitson on occupying the chair as one of the originators of the Company, and suggested that his portrait should be placed on the walls of the Board-room with those of his late father (Mr. W. Kitson) and his brother (Mr. W. H. Kitson), the former Chairmen of the Company.

Mr. C. E. Martin expressed pleasure that steps were about to be taken to bind the employees still more closely to the Company by giving them a bonus.

The report was adopted.

The retiring Directors and Auditor were re-elected, a vote of thanks was accorded to the officials, and the proceedings closed.

WREXHAM GAS COMPANY.

Co-Partnership Scheme—Education of Employees.

The Seventieth Annual Meeting of the Wrexham Gas Company was held on the 19th inst.—Mr. J. Oswell Bury in the chair.

The Secretary (Mr. W. Heyward) having read the notice convening the meeting, the report of the Directors was presented. They stated that the expenditure on capital account during the past year had been largely due to the payment of the final instalment of the cost of the installation of the new carbonizing plant and the extension of the retort-house. There was still a steady demand for slot-meters; the number in use being 3150. There were also more than 2682 gas-cookers in use, and, in addition, 45 heating radiators were fixed out on hire. The works, and also the manufacturing and distributing plant, had been maintained in a condition of thorough efficiency. The interest on loan capital had been paid for the year, as also the interim dividend on the ordinary stock for the June half; and the Directors recommended the payment of a dividend for the six months to Dec. 31, making 5 per cent. for the year.

The Chairman, in moving the adoption of the report, congratulated the stockholders on the continued prosperity and progress of the Company. He said the revenue account was highly satisfactory, showing an increase in the receipts, compared with the previous year, of £1739; and, after deducting an increased expenditure of £659, they had a net augmented revenue of £1080. For gas sold they received £15,738—an advance of £308. Of this sum, £5714 was collected from the prepayment meters. The sale of residual products amounted to £4649, or an increase of £1306. This result was excellent. The expenditure side of the account did not call for special comment beyond the item of £6593 paid for coal, which was higher by £773. The balance on the revenue account was £6476; and, after payment of the full statutory dividends and interest on loans, there remained a surplus of £406. The make of gas last year was 132,040,400 cubic feet—an increase of 6,347,800 cubic feet, or more than 6 per cent. The popularity of the prepayment meters and cookers continued. The Chairman then explained the details of the co-partnership scheme which has been introduced, and said the object was to encourage economy in the manufacture and distribution of gas, and a feeling of personal interest in the general welfare of the Company, by giving to the officials and workmen a bonus on their ordinary salaries and wages, calculated on the price of gas. The offer was made to stimulate thrift; and facilities would be given to the employees to improve their position in life by investing their accumulations of bonus in the Company's stock. The co-partnership scheme was warmly appreciated; and the Directors had not the slightest doubt that its adoption would result in promoting the best possible feeling among the employees, and a keener interest on their part in the prosperity of the undertaking. Before leaving this subject, the Chairman referred to the death of Sir George Livesey and to the

formation of the Memorial Fund, to which, he said, the Directors had contributed £10 10s. He cautioned the shareholders against being led to subscribe to capital required for certain gas undertakings of which prospectuses had been freely circulated, and concluded by mentioning that the new machine carbonizing plant continued to give every satisfaction, and by testifying to the excellent services rendered by the Engineer and Manager (Mr. Joseph Braithwaite), the Secretary, and the whole of the employees.

The DEPUTY-CHAIRMAN (Mr. C. Murless) seconded the motion.

Alderman S. JONES, in supporting the motion, said the co-partnership system which had been introduced promoted a feeling of co-operation and perfect harmony between the workmen and their employers, and he was pleased to find the Company classified among the pioneers in adopting the system. It was a step in the right direction.

After some questions as to the scheme had been answered, the report was adopted.

The dividend recommended was then declared, the retiring Directors and Auditor were re-elected, and a vote of thanks was unanimously accorded to the Chairman.

The CHAIRMAN, in replying, alluded to the interest taken in the younger employees by the Manager, as well as by the Directors, as testified by a letter received from the Organizer of Education for the county, which he read. It conveyed the thanks of the Wrexham District Higher Education Sub-Committee to the Company for the interest they had shown in the evening classes held in Wrexham in connection with the Science and Art School, and for the efforts made by them to secure its success by sending 28 of their employees to the classes and paying their fees, &c. The Committee expressed the hope that other employers of labour would follow this good example. The Chairman added that several of the young fellows had done remarkably well, and on some occasions had come out at the top of all examined. Last year they had one brilliant example of this, when the Assistant-Manager passed the final for a gas managership. He passed with honours, carried off three special prizes, and also the prize for distinction in technology of the Gregson Memorial Fund. This was highly gratifying.

Mr. BRAITHWAITE thanked the meeting for their appreciation of his services. He always tried to do his best. With reference to the boys coming from school, they attended a continuation school owing to the goodness of the Directors; and he thought they would in future bring credit on the Company.

Mr. HEYWARD also expressed his thanks. He said he was glad the Chairman had read the letter from the Director of Education with regard to the Science and Art School. There was no mention of the fact that the gas-works were more like a small college, under the Manager's supervision, for the young fellows, who he hoped would live to appreciate the efforts that were being made on their behalf. They ought to turn out some of the best men in the gas industry.

The proceedings then closed.

CARDIFF GAS COMPANY AND CO-PARTNERSHIP.

Details of the scheme of co-partnership which has been adopted by the Directors of the Cardiff Gas Company were laid before the employees at their annual dinner last Wednesday, by the Chairman of the Company (Dr. W. Taylor). The scheme is similar to those in operation in connection with the undertakings named in the list given in the "JOURNAL" for the 23rd ult. (p. 519).

The Chairman introduced the subject by stating that the output of the Company's works was increasing in a most satisfactory manner, for while it was 700 million cubic feet in 1898, it was 1100 millions last year. The Directors, however, wanted an all-round improvement, an economizing of material, a better make of gas, and a saving of labour and expense wherever possible on the part of the employees; thus enabling cheaper gas to be sent out to the consumers. With the view of encouraging every man to try to get better results from his labour, it was proposed to pay the employees every year a bonus, which would be invested for them in the Company's stock, so that they would become shareholders in the concern. The bonus would be fixed and regulated by the price of gas. If this went up, the bonus would go down; if it went down, the bonus would go up. The rates the shareholders would be recommended to adopt would be: 3s. per 1000 feet, no bonus; 2s. 11d., 1 per cent. bonus on every co-partner's wages or salary; 2s. 10d., 1¾ per cent.; and so on—¾ per cent. being added to the bonus for every 1d. reduction. The present price of gas was 2s. 7d.; and the bonus on this figure would work out for a man earning 38s. 6d. per week, or £100 per annum, to £4. This £4 would be placed to his credit in his pass-book. If the price of gas were reduced by the co-operation of the men to 2s. 3d. per 1000 feet, the bonus would be £7. When there was a sufficient amount standing to a man's credit to buy £10 of the Company's stock, the money could be invested. No payment was required from the men, nor would any of the privileges or benefits of their present employment be taken away. The scheme would be managed by twelve representatives—six to be appointed by the Directors, and six by the employees. The Directors could not, of course, offer co-partnership to everybody at the commencement, and they would naturally give preference to those old and trusty workmen who had proved themselves worthy to be admitted into co-partnership; and there was no reason why the other employees should not become co-partners in time. All the Directors asked was that the newer hands should prove their loyalty and devotion, and so qualify themselves to be placed on the same standard as the other employees. The Directors wished it to be understood that they wanted every man in the works to become a co-partner. Admission to co-partnership would be by agreement, in which the employee would undertake to do his best for the Company. The agreement might be for three, six, or twelve months, at the option of the Directors; and so long as the employee fulfilled the conditions, it would be renewed—thus giving the guarantee of certain employment for a fixed period in advance. The scheme would be started on the 1st of July next, when one year's accrued bonus would be at once placed to the credit of every co-partner; and it would apply to any of the regular winter hands who might be invited to sign the agreement. The Chairman announced that prizes would be offered by the Company for the best suggestions for improvements in working. Boxes would be placed for the reception of these suggestions, and they would be opened and examined half yearly. In conclusion, he explained that the Directors had voluntarily started the scheme, and they must reserve to themselves the right to withdraw it if they found the objects desired had not been attained. Without entire co-operation and hearty support on the part of the employees, co-operation must fail; and it was for the men to say whether or not it was to do so. Knowing as he did the character of the men who had served the Company and were employed to-day, he felt sure that nothing would be wanting on their part to make the co-partnership of the future a great and lasting success. The Chairman's speech was received with very hearty applause.

SEQUEL TO THE BERMONDSEY GAS EXPLOSION.

Inquest on Another "Victim."

Mr. H. R. Oswald, the Coroner for Bermondsey and Greenwich, held an inquest at the Rotherhithe Town Hall last Friday on the body of Mrs. Margaret Coster, aged 37, late of 52, Grange Road, Bermondsey, whose death was alleged to have been the result of shock to the system sustained at the time of the explosion which occurred on the 30th of December. Mr. Cockle, barrister (instructed by Messrs. Dyson), held a watching brief for the husband; and it was explained that proceedings had already been commenced against the parties considered liable for the explosion. Mr. George Coster described the effects of the explosion upon his wife, and stated that she became very nervous, and had to receive medical attention. During the fortnight before her death she became rapidly worse, and died on the morning of the 24th inst. Dr. F. G. Clifton Martin, who had attended Mrs. Coster all through her illness, deposed that from the first she showed that she was suffering severely from shock; and neurasthenia was the result. From the 12th of March onwards, she became much worse. She developed pneumonia; and symptoms suggestive of tubercular meningitis appeared. Bronchitis was present at the same time as the pneumonia. At his *post mortem* examination, full details of which he gave, he found the deceased's body was much emaciated. Deceased was a small and frail woman, and witness from the first attributed her illness to the shock of the explosion, which lowered her vitality so much that she easily became liable to other complaints. Asphyxia, brought about by pneumonia and meningitis, was the immediate cause of death. The Coroner intimated that he should not go into the cause of the explosion, as this had been inquired into, and must be taken as an admitted fact. The question for the Jury was whether or not the explosion accelerated Mrs. Coster's death. In the first case, "Death from accidental causes" would be the verdict; in the second, "Death from natural causes." The Jury's verdict was that Mrs. Coster died of suffocation due to meningitis and pneumonia, and that death had been accelerated by the explosion.

SOUTH METROPOLITAN COMPANY'S RATING APPEALS.

Close of the Local Audits.

Last Wednesday, Mr. H. D. Gordon, one of the Local Government Board Auditors, concluded his audit of the accounts of the Greenwich Union for the year 1907-8, to which the South Metropolitan Gas Company have been objecting, on the ground that a large amount had been improperly paid to Messrs. Dinwiddy and Sons in respect of a portion of their original bill of costs (amounting to £1035 10s.) against the Company, after the latter had unsuccessfully appealed against the valuations placed upon their property in 1905. The Company subsequently had the bill taxed, with the result that it was reduced to £294 15s. Thereupon Messrs. Dinwiddy applied to the Greenwich Union authorities for the balance, together with their charges in other matters; and when the Guardians protested against the amounts, they accepted exactly one-half in settlement. The Gas Company have contested the passing of the accounts of the Bermondsey Borough Council and the Woolwich Union on similar grounds. At Bermondsey, as already mentioned (*ante*, p. 797), Mr. A. Carson Roberts disallowed £112, and the Valuers refunded £122 17s., or more than the disallowance; while at Woolwich, as reported last week (p. 866), Mr. Gordon has surcharged the Guardians £143 16s. Considering that Messrs. Dinwiddy remitted off their Greenwich bill a much larger sum than was disallowed at Bermondsey or Woolwich, the Company have only appeared as objectors in order to preserve their status in each area, and did not contest the accounts in detail.

The accounts of the Union were signed; and it was stated by the Auditor a few days ago, at Woolwich, that the Company had intimated that, being dissatisfied with the disallowances, they would take the matter into Court.

Whitby Gas Company.—At the annual meeting of the Company held on the 20th inst., the accounts presented showed that the revenue last year amounted to £8970, and the expenditure to £6853; leaving £1117 to go to the profit and loss account. The Directors reported a balance of £940 available for distribution; and dividends were declared at the rates of £6 and £4 4s. per cent. per annum on the original and the additional capital. The retiring Directors and Auditor were re-elected; and votes of thanks were accorded to the Directors, officers, and staff. At a subsequent meeting of the Directors, Mr. Freeman Richardson was re-elected Chairman, and Mr. Alexander Allan, the Engineer, Manager, and Secretary of the Scarborough Gas Company, Deputy-Chairman of the Company.

SHEFFIELD SMOKE ABATEMENT EXHIBITION.

Some of the Awards.

We have received from Mr. William Bashforth, the Secretary of the Sheffield Federated Health Association, the promoters of the Smoke Abatement Exhibition recently held in the city, the list of awards made to exhibitors. Among them are the following:

First-Class Diplomas.—Messrs. Babcock and Wilcox, Limited; British Coalite Company, Limited; Crossley Bros., Limited; Davis Gas-Stove Company, Limited (2); Hornsby Stockport Gas-Engine (Roper and Wreaks); National Gas-Engine (Thomas A. Ashton, Limited); Richmond Gas Stove and Meter Company, Limited (2); Messrs. Wilsons and Mathiesons, Limited (3); John Wright and Eagle Range, Limited (4).

Second-Class Diplomas.—"Coalexld" Limited; Smoke Consumption (Cowper-Coles Patent); Victory Smoke Consumer and Fuel Economizer, Limited; Wilsons and Mathiesons, Limited.

GAS AND METER TESTING IN LONDON.

Reports of Professor Lewes and Mr. James Stratford.

In the annual report of Professor Vivian B. Lewes, F.I.C., F.C.S., the Gas Examiner for the City of London, which has just been issued, he states that the results of the tests made during the twelve months ended the 31st of December last show that the supply of gas to the City area was of the most satisfactory character, as the illuminating power of the gas, as tested by the standard argand burner, was in every case well above the statutory limit, while the average was considerably in excess of it. The total number of tests made was as follows: 1860 with the argand burner and 1920 with the flat-flame burner for illuminating power, 870 for sulphur compounds, 921 for sulphuretted hydrogen, and 697 for calorific value.

The Inspector of Gas-Meters (Mr. James Stratford) has also issued his annual report. It states that during the past twelve months 83,369 meters were tested, the fees received being £2533; showing an increase on the year 1907 of 2666 meters and about £58 in fees. The fees do not increase in proportion to the number of meters received; the additional number being caused by the development of trade in prepayment meters and householders cooking by gas. Meters for these purposes are usually small, so that 68,473 were tested at the minimum charge of 6d. each. They, however, require as much care and time for testing as those of larger size and fee. Of the 83,369 meters tested, 38,285 were repaired, 37,144 were new, and in the cases of the remaining 7940 there were disputed registrations. Of the total number of meters tested last year, 44,379 were of the prepayment kind. Another class of prepayment meters have at the index an attachment controlled by a key; and the gas company's assistant calling periodically on the consumer sets the mechanism to pass the quantity of gas paid for at the time. These meters are in much favour with some companies, and about 1000 per annum are tested in the City of London. The number of new and repaired meters rejected and returned to the makers for correction last year totalled 2419; this figure being made up as follows: Fast in registration, 601; slow, 892; passing unregistered gas, 260; leaky, 307; without stops (would work backwards), 39; no passage of gas at 0·5-inch pressure, 84; no passage of gas, 56; defective lights (unsteady), 44; wrong index (had not been in use), 1; other faults (including indices with defective mechanism, &c.), 135. Of the meters tested for disputed registration, 3083 were found to be correct, while 3527 were wrong—1304 being fast and 2223 slow. In addition there were the following faults: Ceased to register, 1198; passing part of gas unregistered, 1372; leaky at index, 1941; defective indices (including hands out of place), 91; miscellaneous, 1605. Of the disputed meters fast in registration, 700 were less than 4 per cent., and 474 were more than this and less than 7 per cent. fast. The greatest error was 29·87 per cent. fast. Of the disputed meters slow in registration, 580 were less than 5 per cent., and 784 more than this and less than 10 per cent. slow, 613 were above 10 and under 20 per cent. slow, and 246 were upwards of 20 per cent. slow.

Mr. Stratford points out that by the Sale of Gas Acts double fees are chargeable for all meters tested *in situ*, with expenses under certain circumstances; but very few meters carrying a testing fee of £10 and upwards are tested by meter inspectors, the fees being prohibitory; and the testing, when done, is carried out by meter makers or by gas companies independently of the Acts. Mr. Stratford says this might be obviated by a more reasonable fee for very large meters. He says: "Some gas companies have well-fitted testing-rooms, and meters removed from their mains are taken first to district offices, from there by van or otherwise to the gas-works, and are tested before being sent to the gas-meter inspectors. The meters so carried from place to place are then put under various tests, and may be quite altered in registration from their condition when removed from the premises of consumers, who may be at a great disadvantage from this cause. I submit that the officially appointed inspector should first test the meter, as soon after its removal from work, and with as little disturbance by carriage, as possible." He says there is still a tendency on the part of some gas companies to take advantage of the Act, by sending meters for testing that are found to be slow in registration, and surcharge the consumer by means of the certificate; and where the meter is fast in registration, the consumer having no knowledge of it, there is reason to fear that the fact is suppressed. This is an evil which he considers is caused by undue pressure being put upon those who are responsible for the distribution of gas to reduce the loss by leakage and other causes. The Sale of Gas Act, 1859, does not give the inspector any control over this fault. "This statement," Mr. Stratford says, "has been criticized as untrue, but not by other inspectors or practical men; and it is inserted with the hope that gas companies who have gas-meter testing-stations may avoid the trouble by sending meters direct from use to the official inspectors appointed under the Sale of Gas Act." Mr. Stratford goes on to point out that the Sale of Gas Act contains no provision for testing the correctness of gas-meter indices beyond the test dial; and he says a satisfactory method is needed before such testing can be effectively carried out, as, to ensure certainty, each index must be carefully tested by an expert before being fixed in the meter by the maker. Not only the wheels of the index, but the templet and position of the dial, the index hands, and the pinions must be examined to ensure correct working at all points of the dial, making this a very difficult work. The mechanical errors are very few, and, with improved methods of manufacture and machinery in use, are now barely possible, and no question of fraud has ever been suggested. He adds that the testing would impose a burden of many thousands of pounds upon gas consumers or ratepayers, and that the public have had no cause to desire such testing.

GAS APPARATUS SUPPLY COMPANIES.

The accounts of Sir William Arrol and Co. for the year 1908 show a profit, including £10,365 brought forward, of £47,369. The Directors recommend the usual dividend of 10 per cent. and the transfer of £1810 to the reserve, making it £16,526, and carrying forward £7807.

The net profits of the New Inverted Incandescent Gas-Lamp Company for the past year were £7059, and £1373 was brought forward. The sum of £1000 is written off patents, and a similar amount is added to reserve, after which a dividend of 6¼ per cent. (free of income-tax) is declared; leaving £1477 to be carried forward.

The Directors of the Sutherland Meter Company, Limited, in presenting the balance-sheet as on Dec. 31, 1908, express regret that, owing to the general depression, which has particularly affected the demand for prepayment meters, the result of the year's trading is disappointing. The profit for the twelve months, together with the balance brought forward from the last account, amounts to £3777; and after deducting the interim dividend on the preference shares (£988), paid in August last, there remains at disposal the sum of £2789. Out of this, the Directors propose to pay the dividend on the preference shares for the half year ended Dec. 31, amounting to £988; and to carry forward the balance to next year. As foreshadowed by the Chairman at the last general meeting, the premises hitherto occupied by the Company at Essex Works have been given up. A factory has been built and equipped on modern lines at Witton; and the removal thereto has been carried out. [This new factory was described and illustrated in the "JOURNAL" for the 16th inst., p. 777.]

The annual meeting of Messrs. C. & W. Walker, Limited, was held last Thursday at Birmingham, under the chairmanship of Mr. J. F. Wright, who moved the adoption of the report, which was noticed in the "JOURNAL" a fortnight ago (p. 803). This showed a profit of £11,723, and a disposable sum of £14,293. The Directors recommended the payment of a dividend at the rate of 5½ per cent. per annum on the preference shares, and a dividend at the rate of 10 per cent. per annum on the ordinary shares; £3000 to be added to reserve, and £8193 carried forward. The Chairman said that, considering the depression of trade and the troublous time through which all iron and engineering businesses had been passing, it was gratifying to the Directors to be able to place so satisfactory a balance-sheet before the shareholders. Good as the balance-sheet looked, it was even better than it appeared, for they had out of profit written-down the investments to present value. In doing this, they reduced the profit by about £450. They had also placed a larger amount to contingent reserve. The past year was the best they had had since 1903. Ten years had passed since the Company took over the business of C. & W. Walker; and comparing the profits made during the ten years preceding 1899 with the ten subsequent years, he said the profits for the first period averaged £8038 a year, whereas those for the second ten years had averaged £12,824—an increase of considerably over 50 per cent. The ordinary shareholders had not only received the whole of their capital back, but nearly 50 per cent in addition. The Company had also paid off the whole of their debentures, amounting to £20,000; they had placed £30,000 to the reserve fund; and £5000 had been written off goodwill. They had contracts in hand for the coming year amounting to £71,000, against £40,000 last year; and this meant that their works were much more fully employed now than they were twelve months ago. Owing to the general slackness of trade, competition during the past year had been extremely keen, and prices had consequently ruled very low; but in spite of this they had been fortunate in securing sufficient work to keep all departments fully employed, and the amount of business done had been greatly in excess of previous years. The prospects of the coming year were, on the whole, quite satisfactory; and, though prices were cut, and to obtain contracts they had to be content with a nominal profit, yet with the improved plant and appliances, and the lessened cost resulting therefrom, they ought to be able to compete favourably, and to show, he hoped, a fairly satisfactory profit at the end of the year. The report was adopted, the dividends recommended were declared, and at a subsequent extraordinary meeting the Articles of Association were altered so as to permit of the payment to each Director of £200 a year (with an extra £100 to the Chairman), and travelling expenses.

Suicide by Gas at Chester.—Staff-Quartermaster-Sergeant Crayner, who lived at Chester, committed suicide last week by sitting in his kitchen with the jets of the gas-stove turned on. In a letter to his wife, he complained that he had been worried over his work, which he was not able to manage properly.

Reduced Charge for Public Lighting in Wandsworth.—The Wandsworth Borough Council have received an intimation from the Wandsworth and Putney Gas Company to the effect that, owing to the reduction recently made in the price of gas, the charges for public lamps will be altered as follows: Single incandescent lamps, with bye-pass, from £3 2s. 9d. to £3 1s. 2d.; do., without bye-pass, from £3 0s. 9d. to £2 19s. 3d.; double incandescent lamps, from £5 10s. 6d. to £5 7s. 4d.; triple and special lamps, from £7 18s. 10d. to £7 14s.; the Town Hall lamp, from £5 10s. to £5 6s. 5d.; the Scott-Snell lamp, from £9 12s. 2d. to £9 6s. 2d.

PUBLIC LIGHTING OF SOUTHAMPTON.

Proposed Greater Use of Electricity.

With reference to a resolution of the Works Committee that the Borough Engineer be directed to give notice to the Gas Company as required for the disconnection of gas-lamps where the same are to be displaced by electric lighting, a letter was addressed by the Acting Secretary to the Southampton Gas Company (Mr. F. Lewis) to the Southampton Town Council, stating that at a meeting of the Directors, held on March 17, the first intimation was received by the Board that their Manager had been notified by the Borough Engineer of the Council's decision to substitute electricity for gas in a large number of lamps in certain streets of the town. The Directors desired him to express their astonishment on learning of such a decision without any previous notification being given the Company of the intention of the Council, so that the merits of the proposal, both as to efficiency and economy, could have been discussed before such a drastic step had been taken. It appeared from the reports in the newspapers that no discussion took place at the meeting of the Council; and the Directors were of opinion that, if the full facts were known to the councillors, the *ex parte* resolution would be rescinded. The Board were preparing information and statistics which they were confident would negative many of the assertions made by the Electrical Engineer to his Committee. The Company, he reminded the Council, were the second largest ratepayers in the borough, contributing last year no less than £4833 to the total rates of the town, of which £2204 were contributions to the general district rate. Under these circumstances, they trusted the Corporation would give instructions for suspending any further dismantling of the lamps until the Company had had an opportunity of furnishing the councillors with a statement showing the actual merits of gas and electricity for public lighting.

The Town Clerk wrote, in reply, that he submitted the letter to the Works Committee, when he was directed to state that the subject of the substitution of electricity for gas in the lamps referred to was fully discussed by the Committee; and their recommendation to the Council thereon was unanimously passed. It might be taken that the fact of the Committee's report being passed without discussion was sufficient evidence of the Council's approval of the alteration. The Committee had asked him to add that they hoped the Southampton Gas Company would give such instructions as might be necessary to enable the Borough Electrical Engineer to proceed with the work, which the Committee understood was at present at a standstill.

PUBLIC LIGHTING AND GAS TESTING IN LIVERPOOL.

Annual Report of the Superintendent.

The report for the twelve months ending Dec. 31 of Mr. A. G. Smith, the Superintendent of Street Lighting, Gas Examiner, and Official Inspector of Gas and Electric Meters to the Corporation of Liverpool, contains the following particulars with regard to the gas supply. It is stated that the work of the department during 1908 was of a routine character; the only special item of interest being that of the automatic lighting and extinguishing of street lamps, on which Mr. Smith reported fully on Dec. 17 (see "JOURNAL" for Jan. 12, p. 117).

The city is at present lighted by 19,085 lamps, 13,095 of them being in the old city and 5990 in the suburbs. They are distributed over 458½ miles. The following table shows the number of lamps used in the lighting of streets, courts, and passages:—

District.	Streets.			Courts.	Passages.	
	Flat Flame.	Incandescent.	Electric.	Flat Flame.	Flat Flame.	Incandescent.
Old City	237	9,310	210	761	2,346	25
Suburbs	33	4,917	12	—	1,006	1
Total	270	14,227	222	761	3,352	26

The following figures compare the present lighting with that of the previous year:—

Year.	Mileage of Streets Lighted.	Price of Gas per 1000 Cubic Feet.	Number of Lamps.	Total Maintenance Charges.
1907	454⅞	2s. 3d.	18,955	£47,780
1908	458½	2s. 3d.	19,085	£48,347

During the past year, the lighting of 3⅜ miles of new streets was carried out by the erection of 106 single incandescent gas-lamps. The lighting of 3⅛ miles of roads was also re-arranged, involving the erection of 7 double and 39 single incandescent gas-lamps, and the removal of 64 existing lamps to new positions; while 78 lamps were removed to new positions owing to the widening of roadways and sidewalks, alterations to property, and other causes. Ten columns were fixed in lieu of brackets, and 22 new columns in lieu of broken ones. The total length of roads lighted at the end of the year (irrespective of passages and courts) amounted to 458½ miles; 5⅛ miles being by electricity, 444 miles by incandescent gas, and the remaining 9⅜ miles, principally back-streets, by the ordinary flat-flame system.

The work of lamp-lighting is carried out by 14 foremen and 183 lighters; the average number of lamps dealt with by each lighter being 110 in the old city and 92 in the suburbs. The entire maintenance of columns, brackets, lamps, and fittings is undertaken by the department; and the following work was carried out by a staff of 71 mechanics, &c. (the figures for 1907 being also given for the sake of comparison):—

	1907.	1908.
On district—		
Columns fixed	220	192
,, reinstated	145	247
Lamps repaired	6,834	8,426
,, reglazed	22,661	27,207
,, changed	2,895	1,989
Visits paid by trimmers to incandescent gas-lamps	236,604	179,679
In workshop—		
Lamps repaired	4,007	4,103
,, reglazed	3,542	3,048
,, manufactured	290	120
In stores—		
Incandescent gas-burners cleaned, repaired and adjusted, &c.	4,588	3,624
New incandescent gas-burners adjusted	1,853	957
Do. chimneys cleaned	202,766	187,479
Regulators cleaned, adjusted, &c.	12,120	9,540
New regulators adjusted only	1,651	720

During the year there were 337 accidents to street-lamps caused by collision with vehicles. In 149 cases the police were able to ascertain the names and addresses of the owners of the vehicles, and accounts for the repairs to the value of £138 5s. 2d. were rendered.

Gas-Meter Testing.

With regard to gas-meter testing, the Inspector reports that during the year the fees of this department amounted to £408, as compared with £444 in the previous year. The following are the details of the year's work:—

	Company's.	Sundry.	Prepayment.
Meters certified	7510	484	1884
,, rejected	23	317	58
	7533	801	1942

The grand total is 10,276, compared with 10,877 in 1907.

Quality of the Gas.

The work of testing the gas supplied to the city by the Liverpool United Gaslight Company for illuminating and calorific power, purity, and pressure, was carried out continuously throughout the year. The illuminating power is fixed by Statute at 20 candles, when measured with a batswing burner consuming 5 cubic feet of gas per hour; the burner in use being known as the No. 7 steatite batswing, approved by the Metropolitan Gas Referees. The gas is tested daily at the office; and, by arrangement with the Gas Company, the Gas Examiner is empowered to test the gas, by means of a portable (Dibdin) photometer, in any part of the city, without notice. Under this arrangement, the apparatus is conveyed to any one of the numerous establishments of the Corporation scattered all over the city, and the gas duly examined. The results of the tests are as follows: Average illuminating value at office, 20·37 candles; in district, 20·63 candles. On 72 occasions during the year the gas was below the standard, as compared with only 37 during 1907. The falling off was due, it is stated, to the Gas Company not being able to obtain cannel from the "Maypole" pit, owing to the disastrous fire there in August last. The gas is tested daily in the office for its calorific value, by means of a Simmance-Abady calorimeter. There were 289 tests made, showing an average of 666 B.Th.U. per foot of gas net, against 668 91 net in the previous year. This, Mr. Smith remarks, may be considered satisfactory.

For carbon monoxide tests, 430 samples of gas were obtained during the year from various parts of the city; the average of the tests being 11·79 per cent.—indicating an admixture of 22·5 per cent. of carburetted water gas, which, he says, is in conformity with the Departmental Committee's recommendations on the subject. But he adds that as much as 18·4 per cent. of carbon monoxide, representing an admixture of 50·6 per cent. of carburetted water gas, has been found at Garston; the average of the tests in this portion of the city being 17·2 per cent., representing an admixture of 45·5 per cent. of carburetted water gas. Under the Gas Company's Act, 1882, remarks the Superintendent, limitation is placed on the amount of the sulphur compounds in the gas; and testing-stations for the use of the Gas Examiner are provided at the various gas-works. At Linacre during the summer months the sulphur compounds present in the gas contained an average excess of 4·33 grains per 100 cubic feet.

Testing of Consumers' Pipes and Fittings.

The Superintendent regrets that this work was not appreciated during the past year to the extent that he would have wished; only 175 tests having been made, as compared with 339 during 1907. He remarks, however, that these have been sufficient to demonstrate the usefulness of the work. Two tests revealed escapes at the rate of from 48 to 24 cubic feet per hour; one, from 23 to 10 feet; nine, from 9 to 5 feet; 45, from 4 feet to 1 foot; 108, from 9-10ths to 1-10th of a foot; while in ten cases the pipes or fittings proved to be sound.

The following instances are cited as of possible interest. In one of the City Clubs, an iron pipe in the bottling binns was badly split; while in the servants' bedroom, a length of copper pipe was leaking all along the brazing, though covered with a thick coating of distemper. The escape at this establishment amounted to 12½ cubic feet per hour, representing an annual loss of £13. In a private residence, a nail had been driven into a pipe, and when the room had been re-papered the nail had been extracted, and the hole covered over by the new paper. For two years the tenant had been compelled to have the window of the room open day and night. In this case, several fitters had unsuccessfully searched for the escape. In a draper's shop, a large escape was due to a supply-pipe close to the ceiling being badly torn, apparently by the settling of the building; and the gas was escaping at the rate of 8 cubic feet per hour. A disused wall-elbow over a child's bed, and quite easily accessible to the child, was found ineffectually plugged with cork, instead of a metal cap. A wall-elbow projecting close to the head of a bed was plugged with grease only, which was liable in warm weather, with extra pressure, to be forced out. In this house,

there were no gas-fittings, the house part being sub-let; and the meter was therefore not accessible for turning off the gas. In one shop the supply-pipe which ran behind the cash-drawer in the wall was badly damaged by the drawer being driven against it, thus embedding the drawer safety chain into the pipe. Frequent cases have occurred where escapes were found to be due to tacks, nails, or pipe-hooks being driven into supply-pipes, and in several instances fitters had been called in to locate the escapes, but had been unable to trace them, and finally the Department's services were requisitioned. Fittings are frequently found defective, especially the taps, which are often discovered without stop-pins to indicate that the gas is properly turned off. The result is that, though the light is extinguished, the tap is partially turned on again, thus allowing gas to escape.

NAPHTHALENE.

During the year, the department received 3424 reports of failures in the gas supply to public lamps due to the presence of naphthalene, as against 4957 in 1907, and 9514 in 1906.

EXPENDITURE.

The total charges in connection with the public lighting of the city, and the supervision of the gas supply for the year, amounted to £52,062; and a revenue of £2724 was derived from the work charged to other departments and bodies, which included a large portion of the gas-fitting work of the Corporation, making a net expenditure of £49,338, as against £48,119 in 1907.

FAZAKERLEY GAS SUPPLY.

During the year much progress was made with the work of supplying gas to the area of Fazakerley. Pending the erection of the works, the Committee decided to take gas in bulk from the Gas Company on the boundary, and supply the houses on the Fazakerley and Moor Park estates. The work of laying the necessary mains was thereupon undertaken, and 149 houses are now supplied with gas; 134 having automatic meters. In addition, in September last, the Committee under agreement took over the gas supply to the Liverpool Land Company's Estate, which involved the supervision of 272 meters, to which were added on Jan. 1 last 54 on Sir W. P. Hartley's estate. This brings the total number of consumers over the whole of the district to date up to 470. Contracts have been accepted for the erection of the buildings and plant; and the work is now in progress. It is confidently hoped that the works will be completed in time to supply gas in the autumn.

LIMERICK CORPORATION GAS SUPPLY.

Proposed Adoption of Carburetted Water Gas Plant.

At the Meeting of the Gas Committee of the Limerick Corporation last Tuesday, the Engineer (Mr. Henry Hawkins) read a report setting forth the results obtained by a deputation of the Committee who had accompanied him on visits of inspection paid to the gas-works in Belfast and Dublin for the purpose of getting particulars of the carburetted water-gas plant in operation there, with the view of the introduction of similar plant in the Limerick Gas-Works.

At Belfast the deputation were courteously received by the Engineer (Mr. R. Sharpe), who devoted more than four hours to them; giving the working details of the plant in the most minute manner. During the interview, a number of important questions were put to him, and his answers to them all were given without hesitation. He said carburetted water-gas plant had been in operation in Belfast about twelve years, and there had been no opposition to it worth mentioning. The average supply was 50 per cent.; and they used about 2½ gallons of oil per 1000 cubic feet. Having stated what he considered to be the chief advantages of carburetted water gas, Mr. Sharpe was asked if he would prefer to extend his coal-gas plant in preference to having it; and he replied: "No; we could not possibly carry on such an undertaking without the aid of carburetted water gas under existing circumstances, being so far from the coal supplies at remunerative prices." The final question as to whether he considered that the percentage of carbon monoxide present in the mixture of the equal quantities of carburetted water gas and coal gas to be injurious to human health; and his answer was: "Not in the least. This is a bogey long since exploded; and as proof of it, we have never been remonstrated with by the authorities or Medical Officers of Health, who are very active in the discharge of their duties." The deputation were then conducted through the works to the various departments, but more especially to the one containing the water-gas plant in operation; and they were greatly interested in its simplicity of action, in the results obtained, and in the cleanliness of the place and the workmen. Mr. Sharpe was cordially thanked for the information he had furnished.

After this interview, the deputation were so satisfied with what they had seen and with the particulars obtained, that it was unanimously decided not to visit England as was originally intended, but to devote their attention to Ireland alone; to go to Dublin and get all the information possible, and then proceed to Kingstown and view the works there. In Dublin, they were met in a most courteous manner by Mr. Cotton, the Manager of the Alliance and Dublin Gas Company. After describing the various advantages of the plant, the members were taken to view it in operation. This was simply a repetition of what had been seen at Belfast. Mr. Cotton stated that there had been opposition at the time of the installation of the plant, but that it had all since died away, and those who were then its greatest opponents were to-day favourable to it. Similar questions to those put to Mr. Sharpe were put to Mr. Cotton; and the answers received were practically the same. Mr. Cotton expressed his surprise that, for works of the size of those at Limerick, the Gas Committee had not long since adopted the carburetted water-gas system, as it was a most necessary auxiliary to many well-equipped works, producing upwards of 50 million cubic feet of gas per annum and located at a distance from the coalfields.

The deputation then proceeded to Kingstown, where the carburetted water-gas plant (in duplicate) has a producing capacity equal to 700,000 feet per day; and they received similar information to that obtained at Dublin and Belfast. They said it was fully demonstrated to them that the introduction of carburetted water-gas plant as an auxiliary would lead to satisfactory results so far as the consumers and ratepayers were concerned; that a mixture of 50 per cent. of this gas with coal gas could be made, if desired, with perfect safety to the public; that a great saving could be effected thereby in the cost of production; while no departure need be made from the rules in force as to the full number of men now employed being retained at their respective duties as hitherto.

At the suggestion of the Mayor (Mr. T. Donnellan), an *addendum* was made to the report to the effect that the deputation were informed in Dublin that, when influenza was prevalent in the city, no person who lived or worked within the area of the gas-works was affected.

A vote of thanks was accorded to the deputation; and it was decided to print and circulate their report.

At the same meeting, Mr. Hawkins read a long report on the working of the gas undertaking during his term of office. Some points therein will be noticed next week.

METROPOLIS WATER SUPPLY.

The Quality of the Water.

At the Meeting of the Metropolitan Water Board last Friday, the Water Examination Committee stated that they had received the third report of the Director of Water Examination (Dr. A. C. Houston) on research work, which dealt with the subject of the storage of raw river water antecedent to filtration. The Committee summarized the three reports, and said the outstanding conclusions were that storage reduced the number of bacteria of all sorts, if sufficiently prolonged; devitalized the microbes of water-borne disease; reduced the amount of suspended matter and of oxygen absorbed from permanganate; tended to lengthen the life of the filters; and rendered a breakdown in the filtering arrangements much less serious than would otherwise be the case. As regards the number of days that a water should be stored before filtration, the Committee thought that the storage necessary for the purposes of quantity would probably be found sufficient for purposes of reasonable safety as regards quality of water under all ordinary conditions. In their opinion, the results of these investigations clearly proved that the policy of storing raw river water antecedent to filtration was sound; and they felt that the habitual use of stored water lightened the grave responsibilities of the Board as regards the safety of the water supply of London, and tended to create a sense of security among those who watched over the health of the Metropolis. The desirability of considering whether supplementary processes of water purification, such as mechanical filters, precipitation tanks, &c., should not be employed to tide over emergencies was, however, a matter which merited attention in the future. They regarded the researches as not only of high scientific importance, but also of great practical utility, having, in their opinion, a direct bearing upon the questions of London's future water supply.

The Chairman of the Committee (Dr. R. M. Beaton), in moving the adoption of the report, pointed out that the three reports which had been furnished by the Director of Water Examination proved that the water supplied to the inhabitants of London was exceptionally safe to drink. Though gibes and jeers were levelled at the Board, he thought the public should be made acquainted with the fact that the quality of the water had improved immensely since its supply had been in their hands.

The report was adopted.

A return was presented relating to the supply of water for the month of February. It showed that the average daily quantity sent out was 211,299,000 gallons. The number of houses, &c., supplied was 1,087,436; the estimated population being 7,040,837. The mean supply per head per day was 30 gallons, compared with 30·1 gallons in the corresponding month last year. The total quantity of water in store in impounding reservoirs at the end of the month was 8032 million gallons, against 7483 millions at the end of February, 1908.

NOTES FROM SCOTLAND.

From Our Own Correspondent.

Saturday.

The joint visit of the Eastern and Western Districts of the Scottish Junior Gas Association to the Carron Iron-Works this afternoon was exceedingly pleasant and interesting. There was an attendance of members of both Districts which was gratifying; the number from each being about equal. The gas appliances section was not seen at its best, on account of the suspension of work in consequence of a strike; but a good object-lesson in the baneful results of industrial warfare was brought home to the visitors in the deterioration, through rust, of the large stocks of unfinished goods. When the strike comes to an end, it will cost the Company no small sum to bring these goods into condition. It was of interest to the visitors, also, to see the whole of the extensive range of steam-boilers fired by waste gases, the utilization of which for such a purpose, instead of burning them at the top of the blast-furnaces, as used to be the case, must be a source of great economy. The experiment of having a joint meeting has been so successful that another next session was bespoken—of a more business nature than the one this afternoon.

Bailie Inches, the Convener of the Finance and Law Committee of the Edinburgh and Leith Gas Commissioners, delivered a lecture on Thursday evening to the members of the Newington Unionist Club, of Edinburgh, on "The Finances of the Gas Commission." The policy of the Commissioners, he said, was to make and sell gas at the cheapest possible price. Maintaining the undertaking in a sound condition of repair from year to year was carried out to the extent of spending

£35,000 per annum. This represented the wages and material employed in the repairing or replacing of worn-out parts. The consumer, for each 1000 cubic feet of gas he used, at 3s. per 1000 cubic feet, was paying rather more than one-third for the on-cost and upkeep of the undertaking; the gas itself costing less than 2s. per 1000 cubic feet to manufacture and distribute. Of this, however, 2¾d. went back into the concern, into either the sinking or the reserve fund; and when he told them that this 2¾d. represented £22,000 per annum, they would see that good care was being taken of the finances of the undertaking. Although the coal bill was a big one, considered by itself, more than 54 per cent. of the amount was repaid by the sale of residual products recovered. The new works, with the new plant and labour-saving arrangements, had resulted in the work being carried out at very much less cost than could possibly be done in the old works; and the saving so brought about had been more than sufficient to pay the capital charges. Altogether, the financial position of the Gas Commissioners was on a thoroughly sound basis. They would be in a condition to reduce the price of gas next year; and as each penny reduction was equal to £8000 per annum off the gas bill of the public, they could calculate for themselves the advantages of the Commissioners' present policy.

A petition is being promoted in Crossgates, asking the Dunfermline District Committee of the County Council of Fife to uphold the protest which they make regarding the proposed formation of a lighting district, and that wayleave be not granted to the Cowdenbeath Gas Company. The petitioners ask for a plebiscite before anything is done.

It is intimated that the claim which Mr. W. Ewing, the late Gas Engineer and Manager at Greenock, is making in his action in the Court of Session against the Corporation of Greenock is for £1645, and is in respect of services rendered as an engineer.

The shares in the Fauldhouse Gas Company, Limited, the new Company which has been formed in Linlithgowshire, have been largely over-applied for. The erection of gas-works is to be proceeded with immediately, as the contract with the County Council stipulates that street lighting is to begin by Aug. 12.

The Gas Committee of the Denny Town Council recommended this week that where gas is used through the same meter for both lighting and cooking, and paid for at the ordinary rate, only half the cooker hire should be charged if not less than 3500 cubic feet of gas were used per quarter. If in any quarter the gas consumed did not amount to this quantity, the full rate should be charged, but there should be an adjustment at the end of the year if the average for the four quarters were up to 3500 cubic feet. The recommendation was adopted.

Mr. S. Milne, the Gas Engineer and Manager to the Aberdeen Corporation, on the instructions of the Gas Committee, prepared a report on the hiring and fixing of gas-stoves, with a view to enabling the Committee to decide whether the department should discontinue the supplying of material and the fitting up of gas-stoves let out for hire. The system of hiring gas-stoves, Mr. Milne reported, has been in use in Aberdeen since 1884. The capital invested in the Gas-Stove Department appears in the books as £10,298 as at July 31 last. The number of stoves on hire prior to the reduction of rental in 1904 was only 1906, or one stove for every 19 consumers; whereas now there are 4020, or one stove for every 10 customers. During the same period the gas consumption has increased from 559 to 717 million cubic feet; and the price has been reduced from 3s. to 2s. 7d. It has been the practice of the Gas Department to connect the stoves free of charge up to from 20 to 30 feet of piping. The Corporation only fixed the appliances which were hired, and which were their own property. Regarding the suggestion that the Gas Department were entering into competition with private traders, Mr. Milne pointed out that there was no possibility of competition in regard to the fixing of gas-stoves, because the department assumed the sole right to connect all hired stoves which were their property. They do no work in connection with the fitting up of gas-stoves which can possibly be construed as entering into competition with traders. They decline to fit up gas-stoves which they sell to consumers. Instead of the hiring of gas-stoves being a burden on the concern as a whole, Mr. Milne claimed that the system generally assisted the entire body of consumers, and so should be encouraged in every legitimate way. The work which the plumbers desired the Town Council to forego amounted to £157 for material and £25 for labour in the course of last year. Those in charge of gas undertakings throughout the country recognize the importance of encouraging the use of gas for cooking and heating, by hiring stoves to consumers upon the easiest possible terms. The system of giving free cookers obtains in many cities; and the result in every case has been an enormous development of the consumption, and a consequent reduction in the price of gas. The Gas Committee considered the report on Wednesday, and resolved that the present system of hiring out and fixing stoves should be continued.

Under the auspices of the Cullen Gaslight Company, an exhibition of Main gas cooking and heating appliances was opened in the Town Hall, Cullen, last Tuesday afternoon. The Chairman of the Gas Company—Mr. Geo. Sievwright—who presided, said that sixty years ago a meeting was convened in the Council Room at Cullen, for the purpose of forming a Gas Company. About forty of the leading men in the district attended. They resolved to promote the Company; and from that day to this the community had enjoyed the benefit of their enterprise. Miss E. M. Dods, of Dundee, lectured in the course of the exhibition, which was well patronized.

The Doune Gas Company, Limited, earned a net profit, in the year ending Feb. 28, of £87. The credit balance amounted to £100. The Directors recommend that a dividend of 5 per cent. be paid.

The Kilmarnock Corporation have placed an order with Messrs. Robert Dempster and Sons, Limited, of Elland, for four through settings of nine retorts, the conversion of six existing settings into throughs, with a producer on one side only, the same as in the new benches, suitable for working in conjunction with an electrically-operated combined charging and discharging machine, also ordered from Messrs. Dempster. This machine will be similar to those in successful operation at the gas-works at Stirling and Falkirk. The contract includes overhead continuous coal-bunkers and conveyors. When completed, the retort-house will be thoroughly up-to-date in every respect. The work is to be started at once, and finished within six months.

CURRENT SALES OF GAS PRODUCTS.

LIVERPOOL, *March* 27.

Sulphate of Ammonia.

There has been a firm market throughout the week, and the tendency of prices has again been in favour of sellers. Production has been freely offered, but though Continental prices have not admitted of much fresh business in that direction, demand for other points has been sufficient to remove available supplies. Home demand has again been more in evidence. So that the closing quotations are £11 11s. 3d. per ton f.o.b. Hull, £11 13s. 9d. per ton f.o.b. Liverpool, and £11 15s. to £11 16s. 3d. per ton f.o.b. Leith. Prompt prices have also been paid for April delivery; but for further ahead, buyers have not displayed much interest, though £11 15s. per ton is still quoted, f.o.b. best ports, for delivery up to the end of the year.

Nitrate of Soda.

Pending the result of the deliberations now going on with the object of renewing the Combination on the west coast, cargoes have been more firmly held. Meantime, local demand has been slow; but spot quotations have been maintained at 10s. 3d. and 10s. 6d. per cwt. for 95 per cent. and refined qualities respectively.

LONDON, *March* 29.

Tar Products.

The markets for tar products remain about the same. Pitch has been steady during the past week; but the tone has been rather quieter within the last day or two. Benzols have been very weak; but there appears to be a little inquiry for toluol.

The average values during the week were: Tar, 13s. to 17s., *ex* works. Pitch, London, 22s. 6d. to 23s.; east coast, 22s. to 22s. 6d.; west coast, 21s. 6d. to 22s. 6d. f.a.s. Mersey ports, 21s. to 21s. 6d. f.o.b. others. Benzol, 90 per cent., casks included, North, 5½d.; London, 6d.; 50-90 per cent., casks included, North, 6d.; London, 6½d. Toluol, casks included, North, 8½d. to 9d.; London, 9d. to 9½d. Crude naphtha, in bulk, North, 3d. to 3¼d.; London, 3¼d. to 3¾d.; solvent naphtha, casks included, North, 9d. to 10d.; London, 10½d. to 11½d.; heavy naphtha, casks included, North, 9½d. to 10½d.; London, 11d. to 11½d. Creosote, in bulk, London, 2¾d. to 2⅞d.; North, 2½d. to 2⅞d. Heavy oils, in bulk, 3d. Carbolic acid, 60 per cent., casks included, east coast, 1s. to 1s. 0½d.; west coast, 11½d. to 11¾d. Naphthalene, £4 10s. to £8 10s.; salts, 35s. to 37s. 6d., packages included and f.o.b. Anthracene, "A" quality, 1½d. to 1¾d. per unit, packages included and delivered.

Sulphate of Ammonia.

This article is steady. The price for Beckton prompt is £11 17s. 6d., and upon Beckton terms £11 10s. In Hull, the price is from £11 10s. to £11 12s. 6d.; in Liverpool, £11 12s. 6d. to £11 13s. 9d.; and in Leith, £11 15s. to £11 17s. 6d.

COAL TRADE REPORTS.

Northern Coal Trade.

There is rather more activity in the coal trade, and the prices of some classes of coal are higher, especially for fuel for forward delivery. In the steam coal trade, there has been some increase of the demand. Best Northumbrian steams are from 10s. 6d. to 10s. 7½d. per ton f.o.b.; second-class steams are firmer at about 9s. 3d. to 9s. 9d.; and steam smalls are also better at from 4s. 9d. to 5s. 6d. The production is increasing; but the approach of the Baltic trade allows it to be taken up well. In the gas coal trade, the contracts are now giving interest. For current sales, the price of Durham gas coal is from about 8s. 9d. to 9s. 9d. per ton for the usual classes, according to quality; and for "Wear specials," up to 10s. 6d. is quoted. As to contracts, the bulk of the needs of the South Metropolitan Company is now arranged for, at prices that are not very dissimilar to those of the Gaslight and Coke Company—from 8s. 6d. to 9s. per ton f.o.b., according to quality. The Newcastle Gas Company have also bought a portion of their supply for next year, at prices that are without material difference—the total in this instance being about 300,000 tons. Other, but smaller, contracts for export have also been concluded, so that a considerable part of the output of some of the collieries has now been disposed of. The prices however, show reductions on preceding contracts in nearly all cases. In the coke trade, the market is steadier; and gas coke, being less plentiful, is higher—from about 13s. to 13s. 6d. per ton f.o.b. in the Tyne.

Scotch Coal Trade.

Trade is looking a little better, so far as volume is concerned. Prices are regarded as disappointing; but there is an expectation of an advance when the Baltic trade opens. Small coal is easily disposed of. The prices quoted are: Ell 8s. 9d. to 9s. 6d., splint 9s. 9d. to 10s., and steam 9s. to 9s. 3d. per ton f.o.b. Glasgow. The shipments for the week amounted to 251,677 tons—a decrease of 15,514 tons upon the previous week, but an increase of 7275 tons upon the corresponding week of last year. For the year to date, the total shipments have been 2,645,485 tons—an increase of 209,320 tons upon the corresponding period.

Ryde Water Supply.—The Ryde Town Council have lately been experiencing difficulty in supplying sufficient water for their district, and they have conferred with Mr. William Matthews, the Consulting Engineer to the South Hants Water Company, on the subject. He has furnished a report, and in accordance therewith a new well, 150 feet deep, with adits running into the chalk (and later on, if necessary, into the upper greensand), is to be sunk, at a cost of £6000. The report contains a recommendation in regard to the provision of machinery and pumps at an outlay of an additional £6500; but this is to stand over for the present. The consumption of water at Ryde has increased from 99 million gallons in 1878 to 217 million gallons last year. The out-districts of the town alone require 21 million gallons of water to supply their wants.

Rhondda Gas and Water Undertakings.

At the last meeting of the Rhondda Urban District Council, the Clerk (Mr. W. P. Nicholas) referred at length to some criticisms which the Local Government Board Auditor had passed upon the finances of the Council. Mr. Nicholas remarked that in regard to the Gas and Water Department they were told that the position was unsatisfactory, and that there was a tremendous waste of gas. It was true that last year they had reached the high-water mark in waste; but no notice appeared to have been taken of the fact that the Rhondda tramlines were being laid during that year, and that a considerable leakage of gas ensued as the result of the work then carried out. He respectfully submitted that it could not be expected of them to attain the impossible in that district. The average amount of leakage in the United Kingdom should not be taken for the purposes of comparison with a mining district. If they referred to other mining districts, they would find abnormal leakages reported, as in the case of the Aberdare and Ferndale Gas Companies. The Council realized that strenuous efforts should be made to reduce the waste; and with this object in view, expert advice had been obtained. Dealing with the financial aspect of the gas and water concerns, Mr. Nicholas pointed out that though these had only been in the hands of the Council for ten years, no less a sum than £78,000 had been paid on account of the principal moneys borrowed. The Council could have spread the repayment of the loan over a period of 45 years; but they had decided to accelerate the payment, with the result that they had paid off £21,000 more than they need have done under the longer period mentioned. A sum of £15,000, which had been spread over a period of ten years only, would next year be entirely wiped out. He maintained that this policy of accelerating the payments was clearly in the interests of the ratepayers; and the wisdom of it would be made manifest before many years would pass. Some people thought the gas undertaking was making no profits; but during the ten years they had been under the Council they had made aggregate profits of £90,000, while the profit on the water undertaking was £42,800. The Auditor had complained that they had put nothing down in respect of depreciation; but he (the Clerk) argued that it would be unfair to expect them to do so, seeing that they had been accelerating the repayments of loans to the enormous extent of £21,000 in ten years. He did not suggest that there were not some points in the report as to which criticisms were not perfectly justified. They could not expect an Authority which expended £458,844 in one year not to afford some room for criticism.

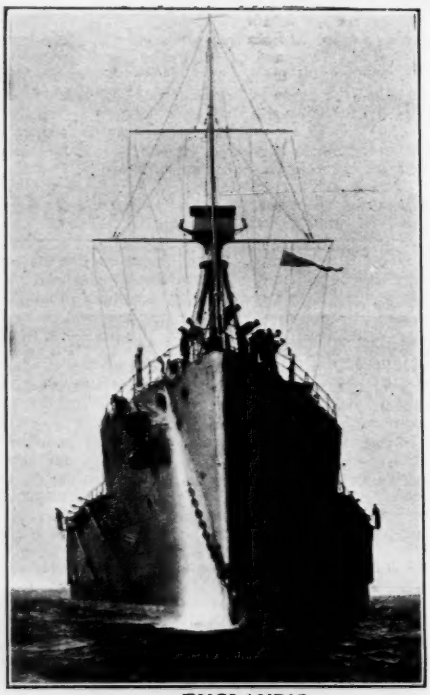
Suicide by Gas.—Last Thursday, Mrs. Pierre Lorillard, of New York, the wife of a wealthy tobacco manufacturer and a sister-in-law of Mrs. Cecil Baring, was found asphyxiated in a bathroom at her residence in Washington. The Coroner's certificate was to the effect that she committed suicide by inhaling gas. She was one of the leaders of American society. No motive has been discovered for the act; but the unfortunate lady had suffered from melancholia.

A Slight Explosion at the Derby Gas-Works.—A trifling accident occurred at the Cavendish Street Works of the Derby Gas Company last Wednesday afternoon. One of the men was emptying a drum of hydrocarbon, which is used for enriching purposes, when by some means the vapour from the oil became ignited, causing a slight explosion. The oil took fire and the roof of a coal-store and the end of the retort-house were slightly damaged. We are pleased to say that altogether the occurrence was a very small affair.

Public Lighting of Windsor.—We learn that under the new contracts for the public lighting of Windsor, a change has come about in which both electricity and gas have their share. Last Thursday, the old contract with the Windsor and Eton Installation Company for the lighting of the whole town terminated; and a new contract commenced for the next five years for the lighting of the main streets only with arc lights. The Corporation have entered into a contract with the Windsor Royal Gaslight Company for a similar period for the lighting of all the side streets; and the Company have provided a really good light. Every lamp is lit and extinguished automatically from the gas-works. In addition, the Gas Company have, at the expense of the Corporation, affixed to each lantern the names of the side streets and roads, painted blue on opaque glass. Every lamp bears a perforated number plate for the purposes of identity and checking, if extinguished by an extraordinary cause. The electric standards are being removed.

Water Charges at Public Buildings.—In a letter addressed to the Acton Education Committee, the Metropolitan Water Board replied to a recent application of the Committee to be charged for water supply by meter instead of on the basis of the assessable value, as the cost was greatly increased, though the consumption remained the same. The Clerk to the Board (Mr. A. B. Pilling) wrote to the effect that the Committee were no doubt aware that under section 9 of the Charges Act the rebate on the domestic water-rate could not be claimed unless (*inter alia*) the premises supplied were occupied for the purposes of a business, and such business was one from which the occupier sought a livelihood or profit. This had hitherto interposed a difficulty in granting the rebate to schools and certain other classes of public buildings. The subject had been recently further considered by the Board, with the result that they had decided that, if the other provisions of section 9 —viz., that the assessable value of the buildings was over £300, and no inhabited house duty was payable upon them—were complied with, the rebate was not to be withheld from a house or building occupied for the purposes of a trade or business merely on the ground that the occupier did not seek a profit from it. The Board felt that this concession would be welcomed by those to whom it was made; but as it would involve the sacrifice of money which the Board might receive if they construed the Act strictly, they reserved the right of reviewing the matter should occasion arise. This means that, subject to the conditions mentioned, the Board have decided to waive refusing to concede the rebate to schools and certain other classes of public buildings under section 9 of the Charges Act.

"DREAD-NOUGHTS"



ENGLAND'S.

RICHMOND'S.

THE RICHMOND GAS STOVE & METER CO., LTD.

Advertisement of the RICHMOND GAS STOVE & METER CO., LTD.

London Offices and Show-Rooms: 132, Queen Victoria Street, E.C. *General Offices and Works: Warrington.*

Public Lighting Question in Marylebone.—It is reported that the Marylebone Borough Council propose to appeal to the Local Government Board against the recent refusal of the London County Council to sanction a loan of £8000 for the purpose of substituting electric for gas lighting in the principal streets of the borough where the distributing mains of the Council's electricity undertaking are already laid (see *ante*, p. 797). Meanwhile, the Electric Supply Committee have decided to carry out the work.

Gas Explosion at Lord Althorp's House.—A gas explosion occurred on Monday last week at Dallington House, Northampton, the country residence of Lord Althorp, the Lord Chamberlain. The explosion took place in the servants' quarters, and was apparently caused by a housemaid striking a match to discover an escape of gas. The stone walls of the building, which are 2 feet thick, were bulged out at the front and back, and a considerable portion of a side wall was blown down. The housemaid was thrown across the room, and was found to be burned about the face, arms, and back. Fire broke out, but was extinguished by the prompt action of the gardener, who brought the portable fire-engine into play.

Proposed Amendment of the Public Health Act, 1875.—The Bill brought in by Mr. Leif Jones last session, and dropped, to amend the Public Health Act, 1875, has been re-introduced. The object of the Bill, it may be remembered, is to carry out certain recommendations made by a Select Committee of the House of Commons so long ago as 1878, when the Law Officers of the Crown advised that a Provisional Order which proposed to empower the acquisition of water rights otherwise than by agreement could not be made under the Public Health Act, 1875. The Bill proposes that the Local Government Board should be empowered to issue such Provisional Orders, which should incorporate the Water-Works Clauses Act, 1847.

West Ham Gas Company's New Show-Rooms.—The first article in the current issue of the "South Essex Critic" is devoted to a notice of the new show-rooms of the West Ham Gas Company in Woodgrange Road, Forest Gate, which are characterized as "a credit to the neighbourhood." The writer points out that the residents of Forest Gate have never till now had the opportunity of witnessing every phase of the elaborate and wonderful adaptations of gas; and consequently the new show-rooms have attracted "thousands of wondering sightseers." He goes on to say: "There are lamps of every conceivable colour and design, fire-grates and modern mantel-pieces the most artistic and beautiful which the mind can conceive, suited alike for the mansion or the cottage; cooking-stoves of every size, to suit all classes and conditions of households, and arranged so as to show their general qualifications, if not in actual practice, as nearly so as this excellently-fitted exhibition will permit." He concludes by remarking that, "whether the proposed amalgamation of the Gas Company becomes an actual fact or not, the amalgamation of every conceivable article relating to gas progress is to be witnessed; and the utmost credit is due to those to whom was entrusted the arrangement of this elaborate display."

Couple Found Dead at Carlisle.—At an inquest at Carlisle on the bodies of Ellen Bond and Anthony M'Cormick (who were found lying dead on a bed in a house occupied by the latter), the Jury returned a verdict that the deceased had been asphyxiated by gas from a defective meter. When last they were seen alive, the man was under the influence of drink. The room smelt strongly of gas; and on investigation it was found that the meter had been tampered with and the solder partially melted, with the result that the gas escaped freely. The theory was expressed that the meter had got knocked, and probably either Bond or M'Cormick had gone to it with a match, thus igniting the escape of gas and causing the solder to melt. The flame at the time might have been extinguished, but the further escape ignored.

Public Lighting of Boscastle.—Rival offers for the lighting of the village of Boscastle are engaging the attention of ratepayers at that picturesque spot. An Exeter acetylene gas company seems to have been first on the scene with an offer to light the public lamps for £1 each per annum, provided they were given a contract for three years and permission to lay mains and supply private consumers. Then an electric lighting firm from London came along and offered to do the public lighting for 18s. per lamp. Representatives of both the acetylene and the electricity firms attended a meeting of the ratepayers yesterday week, and explained their offers at length. Each guaranteed that the lights to be provided for the public lamps should be of 50-candle power, and that beyond the 18s. or £1 per lamp to be charged, the ratepayers should have no further liability. The meeting appears to have been embarrassed by the choice offered; and a non-committal resolution was passed, to the effect that if either company were prepared to provide better lights than the existing oil-lamps, without extra cost to the ratepayers, the parish would be prepared to take the lights from them. A further meeting is to be held.

Monte Video Water-Works Company, Limited.—At the ordinary general meeting of the Company last Thursday, the Chairman (Mr. James Anderson), in moving the adoption of the report already noticed (*ante*, p. 872), stated that the increase in the number of services during the past year had been 1148, or 7·4 per cent., which was the more satisfactory, as it followed a specially large increase in the preceding year. Their gross income had nearly kept pace with the services; the increase having amounted to £8152, or 7·08 per cent. The net revenue, however, did not make quite such a good showing, being only £2695, or 3 per cent. more than that of the year 1907. The additional capital spent during the year reached the very large total of £228,231. To complete all the works now in hand would involve a further expenditure of about £20,000, after which he thought they would be free from any serious outlay for some years. The resolution adopted by the Board about three years ago, to reduce the tariff on their own initiative, had resulted most satisfactorily. Their relations with the authorities continued to be good. The latter were always on the alert to protect the interests of the public in the matter of the water supply; but, while so doing, they had shown every disposition to treat the Company fairly and considerately. The report was adopted.

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Gas for the Public Lighting of Melton Mowbray.—For the past eight years the public lighting of Melton Mowbray has been in the hands of the Electric Company; but at the meeting of the Urban District Council last Wednesday, it was unanimously decided to give the contract for the next five years to the Gas Company. Several new lamps will be erected; and when the contract commences in August next, the town will have another opportunity of seeing what can be done in modern gas lighting.

Stratford Ratepayers and the Proposed Amalgamation of Gas Companies.—At the meeting of the West Ham Corporation last Tuesday, the Legal Committee reported that they had received a deputation from ratepayers in High Street, Stratford, with reference to the proposed amalgamation of the Gaslight and Coke and West Ham Gas Companies. The deputation presented a petition, signed by more than 5000 inhabitants, against the Bill to give effect to the amalgamation; and the members expressed themselves in strong terms against the measure.

Large Reservoir in Brazil.—Plans for the construction of the large reservoir to be erected at Japy, on the border of the States of Parahyba and Rio Grande do Norte, have been completed. In cases of emergency, it will be capable of supplying a population of 100,000. The dam erected between two chains of rocky mountains will be 130 feet long at the base and 500 feet long at the crest, and the depth will be 165 feet. The capacity of the reservoir will be 110,000 million gallons; and it will be fed by the Jaca and its tributaries. The cost is estimated at £300,000.

Swansea Electricity Undertaking.—According to the "Financial News," the London Syndicate who are about to offer to purchase the electricity undertaking of the Swansea Corporation at the full capital price (£150,000) are stated to propose, if the offer is accepted, to erect a new station at the docks. They say that by the utilization of waste heat from neighbouring works, they are prepared to give a guarantee to reduce the charges for electricity 5 per cent. in the first two years and 10 per cent. afterwards. The capital necessary is estimated at £250,000.

Wirksworth Water Scheme.—On behalf of the Wirksworth Urban District Council, a new water scheme has been prepared by Messrs. Hodson, of Loughborough. They estimate that a scheme can be carried out for £7000, taking water from the Wigwell watershed; 100,000 gallons a day being the necessary quantity to bring the supply of the town up to requirements. They do not recommend the taking of water from the Derwent Valley scheme, on the ground that the nearest main is 3½ miles away, and the cost would be £840 a year. The Council have the matter under consideration.

Condition of the Birmingham Water-Pipes.—Mr. T. H. Berry, a member of the Handsworth District Council, made the following statement during a recent discussion on the Greater Birmingham scheme: "There was one serious matter in regard to the Welsh water. As they knew, the water 'killed' their kettles, and inasmuch as the aqueducts were constructed of iron, they could imagine what a cost this meant to the city. There was no doubt the water question was very serious for Birmingham, as they might have to consider not only the question of preparing for a sinking fund, but also the reconstruction of its waterways." Interviewed on the subject by the representative of a local paper, Mr. Lees, the Secretary of the Water Department, said there was absolutely no foundation for Mr. Berry's suggestion, as the pipes of the aqueduct were in as good condition as when laid. Occasionally pipes had burst—a circumstance inevitable in a waterway of this kind; and the interior of the pipes was quite fresh, not showing the slightest evidence of action by the water. The "lining" was perfect. The pipes were cast iron—quite different from that of the ordinary household kettle. In certain sections along the aqueduct, the ground underneath the pipes was being strengthened with concrete. This was to obviate strain on the pipes caused by the uneven ground. The bursts there were due mainly to this unevenness; certainly not to the cause suggested by Mr. Berry.

Opposition to the Electricity Loan for Hastings.—At the Town Hall, Hastings, last Tuesday, Dr. A. W. Brightmore, M.Inst.C.E., held an inquiry into an application made by the Corporation to the Local Government Board for authority to borrow £5000 for electric lighting purposes. The Town Clerk (Mr. B. F. Meadows) represented the Corporation; Mr. Patrick Hastings, barrister, appeared on behalf of the Hastings and St. Leonards Gas Company, who opposed the proposed loan. The Town Clerk explained that the loan was for prospective capital expenditure, and said there was nothing of a novel character in the application; the Local Government Board having previously sanctioned loans for similar purposes. Mr. G. R. Butterworth (the Borough Accountant) was questioned as to the position of the electricity undertaking, and he said he could not agree that it had been an increasing loss from the beginning. He acknowledged that the net deficiency on trading amounted to £11,338; but he said it was not true that the Corporation were selling current at a loss. The deficiency was caused by the fact that they were purchasing the undertaking and goodwill. Allowing for this, there was no trading loss. Mr. Hastings said the Gas Company, merely as ratepayers, opposed the reckless manner in which the money sanctioned by the Local Government Board from time to time had been spent. The Corporation were selling current at a loss, and every year the rates were increasing to make up the deficiency on the electricity account. The only course, therefore, was for the Corporation to apply to the Local Government Board to have their Electric Lighting Order cancelled. He could not see why the ratepayers should subscribe £1500 to supply four ratepayers with electricity. The Town Clerk submitted that the opposition was that of an opposing Company, and resolved itself into one case in which, it was true, the Corporation's expectations had not been fulfilled. The opposition was not a genuine one; it was simply for the purpose of crippling the Corporation in the carrying out of their undertaking. Mr. H. B. Carter, on behalf of the Ratepayers' Association, said his Association did not think the granting of large loans in advance was desirable, and they were not satisfied with the manner in which the last loan had been spent.

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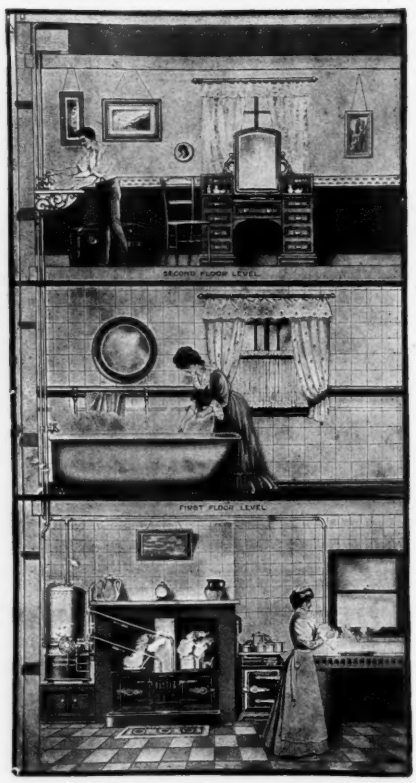

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Bacup Corporation's New Water Scheme.—Alderman J. Craven Hoyle, J.P., addressing a meeting of Bacup tradesmen last Tuesday, said that the water undertaking at Cowpe, on which the Corporation had spent considerably more than £200,000, was now practically completed, and the reservoir had been filled to within seven inches of the high-water mark. He added that the Water-Works Committee had watched the filling up with some amount of anxiety; but the Engineers had intimated that the reservoir was water-tight.

Alliance and Dublin Consumers' Gas Company.—At the half-yearly meeting of this Company to-morrow, the Directors will report that the gross revenue in the six months ended the 31st of December amounted to £160,666, and the expenditure (including interest on loan capital, &c.) to £135,609; leaving a balance of £25,057. They recommend payment of dividends at the rates of 10 and 7 per cent. per annum on the respective shares, which will require the withdrawal of £9950 from the reserve fund, and leave a balance of £43,255 in the fund. There was a decrease in the quantity of gas sold in the half year, compared with the corresponding period of 1907, during which the Irish International Exhibition was running, and causing a large consumption of gas.

Wokingham Parish Council and the Yorktown and Blackwater Gas Bill.—At the meeting of the Wokingham Parish Council on Monday last week, the Chairman (Mr. De Vitré) read a letter from the Yorktown and Blackwater Gas Company, asking the support of the Council to their Bill, another letter from the Rural District Council, asking for an expression of opinion on the measure, and a further letter from the Company to the Rural District Council, who have lodged a formal petition against the Bill. The Company said they were prepared to lay mains and supply gas for lighting at 3s. 6d., and for power purposes at 2s. 9d. per 1000 cubic feet in certain specified roads, and also offered to pay all reasonable expenses if a conference of representatives could be arranged. The Chairman pointed out that three courses were open to the Council—viz., (1) to oppose the Bill, giving reasons; (2) to remain neutral; and (3) to pass a resolution in favour of the Bill. He proposed to send a copy of their decision to the Company and to the Rural District Council. After some discussion upon several propositions, it was decided that the Council should remain neutral.

Consolidated Water-Works Company of Rosario.—The report of the Directors for the past year sets forth that the gross revenue, after making due provision for bad and doubtful debts, amounted to £78,719, and the working expenses to £32,360; leaving £46,359, which has been carried to net revenue account. After deducting debenture stock interest and other charges, and interim dividends on the ordinary and preference shares of 3 per cent., placing £3421 to the reserve fund for the reduction of capital, £7500 to the general reserve and contingency fund, and £2500 to the depreciation fund, there remains an available balance of £14,391. The Directors recommend a dividend of 3 per cent. on the preference shares and a dividend of 4 per cent. on 15,000 ordinary shares and on instalments on 5000 new ordinary shares (making, with the interim dividend, 7 per cent. for the year, free of tax); leaving a balance to be carried forward to the ordinary share dividend account of £2808. The Company's business continues to expand, and the consumption of water to increase. The number of consumers was 14,895 at the end of 1908, in comparison with 13,527 at the corresponding period of the previous year. The prospects of continued development are promising.

Mr. George Mills, of Newcastle-on-Tyne, who has for many years been well known in the gas-stove and meter trade, has been appointed by Messrs. R. Laidlaw and Son (Edinburgh), Limited, to act as their chief representative in Scotland and the North of England.

Messrs. D. Anderson and Co., lamp manufacturers, had a slight fire on Saturday at their works, Nos. 18 and 20, Farringdon Road, E.C. Although the unfortunate occurrence has naturally caused the firm considerable inconvenience, it will not prevent the carrying on of work and the execution of orders as usual.

The Guildford Town Council have resolved to apply to the Local Government Board to sanction the borrowing of £4079 in order to meet the cost of the Woking water arbitration. The Taxing Master had struck off £596 of the Corporation's costs, allowing £2267. The Woking Water Company's costs were passed at £1811, after £1915 had been taxed off.

According to the financial correspondent of the "Daily Telegraph" in New York, there was a rise of 3⅞ in Consolidated Gas stock last week. This rise was one of the most important incidents of the week; carrying the price more than half-way back to the point where the decision of the Supreme Court caused a loss of 50¾ points. Within ten days the stock has regained 26 points.

The following paragraph appeared in the editorial columns of the "Financial News" last Saturday: "Debentures of the Water-Works, Lighting, and Power Investment Corporation are now being pushed for sale by our old friends at 99, Cannon Street. We have no doubt, by the way, that the London and County Bank's name is being used with its consent; but we would suggest that any intending purchaser should ask the London and County Bank what it will lend on these debentures when he has bought them. The reply will be instructive."

The final tie in the Dorset Senior Cup competition was played on the 20th inst., at Dorchester, between the Branksome (Bournemouth) Gas-Works Athletic Club and Weymouth. The result was a brilliant victory for the former, who scored ten goals to none by their opponents. At the conclusion of the match, the cup was presented to the victorious club by Captain Simmonds, Vice-President of the Dorset Football Association. A scene of the greatest enthusiasm prevailed when the trophy was handed to Captain Rendle; and each member of the team was heartily cheered as he received his medal. A local paper says the victory was well deserved on the play; for the Gas-Works Club were a vastly superior side. Except on two or three occasions, Weymouth never looked like scoring.

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£			p.c.				£ s. d.
590,000	10	Oct. 15	10	Alliance & Dublin 10 p.c.	18¾—19	..	5 5 3
298,955	10	,,	7	Do. 7 p.c.	12½—13¾	..	5 5 8
310,000	Stk.	Jan. 14	4	Do. 4 p.c. Deb.	98—100	..	4 0 0
200,000	5	Oct. 29	⅝	Bombay, Ltd.	5⅜—5⅝	..	5 10 8
40,000	5	,,	⅝	Do. New, £4 paid	4⅛—4½	+⅛	5 18 11
50,000	10	Feb. 25	14	Bourne- mouth Gas and Water	10 p.c.	..	4 14 11
51,810	10	,,	7		B 7 p.c.	..	4 3 7
53,200	10	,,	6		Pref. 6 p.c.	..	3 15 0
380,000	Stk.	,,	12½	Brentford Consolidated	245—248	..	5 0 10
300,000	,,	,,	5¾	Do. New	185—188	..	5 1 1
50,000	,,	,,	5	Do. 5 p.c. Pref.	120—122	..	4 2 0
206,250	,,	Dec. 11	4	Do. 4 p.c. Deb.	101—103	..	3 17 8
220,000	Stk.	Mar. 12	10⅝	Brighton & Hove Orig.	209—212*	..	5 1 5
246,320	,,	,,	7½	Do. A Ord. Stk.	150—153*	..	5 1 4
460,000	20	Oct. 15	10	British	42—43	..	4 13 0
109,000	Stk.	Feb. 25	6	Bromley, Ord. 5 p.c.	114—117	+1	5 2 7
165,700	,,	,,	4½	Do. do. 3½ p.c.	85—87	+1	5 3 6
500,000	10	Oct. 15	7	Buenos Ayres (New) Ltd.	12⅞—13¼	..	5 5 8
250,000	Stk.	Dec. 11	4	Do. 4 p.c. Deb.	94—96	..	4 3 4
150,000	20	Feb. 25	7½	Cagliari Ltd.	25—26	..	5 11 6
100,000	10	—	—	Cape Town & Dis., Ltd.	4½—5½	..	—
100,000	10	Apl. 26	4½	Do. 4½ p.c. Pref.	4½—5⅛	..	8 3 8
50,000	50	Nov. 3	6	Do. 6 p.c. 1st Mort.	47—49	..	6 2 5
100,000	Stk.	Dec. 30	4½	Do. 4½ p.c. Deb. Stk.	76—78	..	5 15 5
157,150	Stk.	Feb. 25	5	Chester 5 p.c. Ord.	109—111	..	4 10 1
1,493,280	Stk.	Mar. 12	5 2/10	Commercial 4 p.c. Stk.	106—108*	..	4 16 4
560,000	,,	,,	5	Do. 3½ p.c. do.	101—103*	..	4 17 1
475,000	,,	Dec. 11	3	Do. 3 p.c. Deb. Stk.	81—83	..	3 12 3
800,000	Stk.	,,	6½	Continental Union, Ltd.	101—103	..	6 6 3
200,000	,,	,,	7	Do. 7 p.c. Pref.	138—141	..	4 19 3
492,270	Stk.	—	5	Derby Con. Stk.	121—123	..	4 1 4
55,000	,,	—	4	Do. Deb. Stk.	103—105	..	3 16 2
148,995	,,	Sep. 30	5	East Hull 5 p.c. Ord.	98—100	..	5 0 0
486,092	10	Jan. 28	12	European, Ltd.	23⅝—24½	..	4 19 0
354,060	10	,,	12	Do. £7 10s. paid.	17½—18½	..	4 18 5
15,161,545	Stk.	Feb. 11	4/10/8	Gas light and Coke	4 p.c. Ord.	−1	4 10 2
2,600,000	,,	,,	3½		3½ p.c. max.	+½	3 18 8
3,799,735	,,	,,	4		4 p.c. Con. Pref.	..	3 15 6
4,193,975	,,	Dec. 11	3		3 p.c. Con. Deb.	..	3 10 2
258,740	Stk.	Mar. 12	4⅝	Hastings & St. L. 3½ p.c.		..	5 0 0
82,500	,,	,,	6¼	Do. do. 5 p.c.		..	5 11 7
709,000	10	Oct. 15	11	Hongkong & China, Ltd.		..	5 18 11
123,570	Stk.	Mar. 12	6½	Ilford "A" and "C"		..	4 17 9
65,783	,,	,,	5	Do. "B"		..	4 16 2
51,000	,,	Dec. 30	4	Do. 4 p.c. Deb.		..	3 16 11
4,949,000	Stk.	Nov. 13	8	Imperial Continental		+1	4 7 0
473,600	Stk.	Feb. 11	3½	Do. 4½ p.c. Deb. Red.		..	3 12 11
195,242	Stk.	Mar. 12	6	Lea Bridge Ord. 5 p.c.		..	5 0 10

Issue.	Share.	When Dividend.	Dividend or Dividend & Bonus.	NAME.	Closing Prices.	Rise or Fall in Wk.	Yield upon Investment.
£			p.c.				£ s. d.
561,000	Stk.	Feb. 25	10	Liverpool United A.	222½—224½	−2½	4 9 1
718,100	,,	,,	7	Do. B.	69½—71½	..	4 1 7
306,083	,,	Dec. 30	4	Do. Deb. Stk.	105—107	..	3 14 9
75,000	5	Dec. 11	6	Malta & Mediterranean.	4¾—5	..	6 0 0
560,000	100	Oct. 1	5	Met of 5 p.c. Deb.	101—103	..	4 17 1
250,000	100	,,	4½	Melbourne 4½ p.c. Deb.	101—103	..	4 7 5
541,920	20	Nov. 13	3½	Monte Video Ltd.	12½—12⅝	..	5 9 10
1,775,892	Stk.	Feb. 25	4½	Newc'tle & G'tesh'd Con	107—108	..	4 3 4
518,795	Stk.	Dec. 30	3½	Do. 3½ p.c. Deb.	91—93	..	3 15 3
15,000	10	Feb. 25	10	North Middlesex 10 p.c.	19½—20	..	5 0 0
55,940	10	,,	7	Do. 7 p.c.	13—13½	..	5 3 8
300,000	Stk.	Nov. 27	8	Oriental, Ltd.	140—142	..	5 12 8
60,000	5	Sept. 30	8	Ottoman, Ltd.	6½—6⅝	..	6 5 6
31,830	53	Feb. 25	13	Portsea Island A.	135—137	..	5 0 7
60,000	50	,,	13	Do. B.	129—131	..	4 19 3
100,000	50	,,	12	Do. C.	119—121	..	4 19 2
114,800	50	,,	10	Do. D and E.	101—103	..	4 17 1
398,490	5	Oct. 29	7	Primitiva Ord.	6—6½	−⅛	5 7 8
796,682	5	Jan. 28	5	Do. 5 p.c Pref.	5—5⅛	..	4 15 3
488,900	100	Dec. 1	4	Do. 4 p.c Deb.	95—97	..	4 2 6
1,000,000	10	Oct. 15	8	River Plate Ord.	13¾—14¼	−¼	5 12 3
312,650	Stk.	Dec. 30	4	Do. 4 p.c. Deb.	95—97	..	4 2 6
250,000	10	Sept. 30	8	San Paulo, Ltd.	14—14½	..	5 10 4
62,500	10	—	—	Do. 6 p.c. Pref.	11½—12	..	5 0 0
125,000	50	Jan. 2	5	Do. 5 p.c. Deb.	49½—50½	..	4 19 0
135,000	Stk.	Mar. 12	10	Sheffield A	236—238*	..	4 4 0
269,984	,,	,,	10	Do. B	236—238*	..	4 4 0
523,500	,,	,,	10	Do. C	234—236*	..	4 4 9
70,000	10	Oct. 29	10	South African	13⅜—14	..	7 2 10
6,429,895	Stk.	Feb. 11	5/6/8	South Met., 4 p.c. Ord.	120—122	..	4 7 4
1,895,445	,,	Jan 11	3	Do. 3 p.c. Deb.	84½—85½	..	3 10 2
209,820	Stk.	Mar. 12	8	South Shields Con. Stk.	152—154*	+2	5 3 11
605,000	Stk.	Feb. 25	5½	S'th Suburb'n Ord. 5 p.c.	119—121	..	4 10 11
60,000	,,	,,	5	Do. 5 p.c. Pref.	120—122	..	4 2 0
117,058	,,	Jan. 14	5	Do. 5 p.c. Deb. Stk.	124—126	..	3 19 4
502,310	Stk.	Nov. 13	5	Southampton Ord.	109—111	..	4 10 1
120,000	Stk.	Feb. 25	6⅔	Tottenham A 5 p.c. and B 3½ p.c.	131—133	..	5 1 6
423,940	,,	,,	5⅓		108—110	..	4 15 5
149,470	,,	Dec. 30	4	Edmonton 4 p.c. Deb.	100—102	..	3 18 5
182,380	10	,,	8	Tuscan, Ltd.	8⅜—9⅛	..	8 13 0
149,900	10	Jan. ,,	5	Do. 5 p.c. Deb. Red.	99—101	..	4 19 0
236,476	Stk.	Feb. 25	5	Tynemouth, 5 p.c. max.	105—107	+1	4 13 6
255,676	Stk.	Feb. 25	6⅔	Wands- B 3½ p.c. worth 3 p.c. Deb. Stk.	131—133	..	4 17 9
79,416	,,	Dec. 30	3		72—74	..	4 1 1
895,872	,,	Feb. 25	5½	West Ham 5 p.c. Ord.	113—115	..	4 11 4
210,000	,,	,,	5	Do. 5 p.c. Pref.	124—126	..	3 19 4
253,300	,,	Dec. 30	4	Do. 4 p.c. Deb. Stk.	105—107	..	3 14 9

Prices marked * are "Ex div."

NOTICES TO CORRESPONDENTS, ADVERTISERS, AND SUBSCRIBERS.

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All Communications, Remittances, &c., to be addressed to WALTER KING, 11, BOLT COURT, FLEET STREET, LONDON, E.C.

Telegrams: "GASKING, LONDON." Telephone: P.O. 1571a Central.

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O'NEILL'S OXIDE
For GAS PURIFICATION.
LARGEST SALE OF ANY OXIDE.

SPENT OXIDE PURCHASED IN ANY DISTRICT.

GAS PURIFICATION & CHEMICAL CO., LD.,
PALMERSTON HOUSE,
OLD BROAD STREET, LONDON, E.C.

WINKELMANN'S
VOLCANIC" FIRE CEMENT.
Resists 4500° Fahr. Best for GAS-WORKS.
ANDREW STEPHENSON, 182, Palmerston House, Old Broad Street, London, E.C. "Volcanism, London."

SPENCER'S PATENT HURDLE GRIDS.

THE very best Patent Grids for Holding Oxide Lightly.
See Illustrated Advertisement March 2, p. 821.

BROTHERTON & CO., LIMITED.
Offices: City Chambers, LEEDS.
Correspondence invited.

LUX'S GAS PURIFYING MASS.
See Advertisement on p. 885.
FRIEDRICH LUX, LUDWIGSHAFEN-AM-RHEIN.

KINGS Patent Agency, Limited, 165, Queen Victoria Street, London, E.C. Director Benj. T. King, A.I.M.E., British Chartered Patent Agent (Regd. by Exam.). Telep. 682 Central. Teleg. "Geologic," London. We sustain over quarter of a century's Experience and Reputation for Patenting Inventions and Registering Trade Marks throughout the World. Write or call. We attend and advise you free.

OXIDE OF IRON FOR GAS PURIFICATION.

Please Address Inquiries for Analysis and Prices to the
NEW WESTBURY IRON COMPANY, LTD.,
WESTBURY, WILTS.

GAS PLANT for Sale—We can always offer NEW and SECOND-HAND GAS APPARATUS, including Retorts and Fittings, Condensers, Exhausters, Scrubbers, Washers, Purifiers, Gasholders, Tanks, Valves, Connections, &c. Also a few COMPLETE WORKS. Compare Prices and Particulars before ordering elsewhere.
FIRTH BLAKELEY, SONS, AND COMPANY, LIMITED, Thornhill, DEWSBURY.

SULPHURIC ACID for Sale, specially suitable for making Sulphate of Ammonia.
BROTHERTON AND CO., LTD., Chemical Manufacturers, Works: BIRMINGHAM, LEEDS, WAKEFIELD, and SUNDERLAND.

D. ANDERSON AND COMPANY,
GAS LIGHTING ENGINEERS AND CONTRACTORS,
18 & 20, FARRINGDON ROAD, LONDON, E.C.
Telegrams: "DACOLIGHT LONDON." Telephone: 2336 HOLBORN.

SULPHATE OF AMMONIA SATURATORS and all LEAD and TIMBER WORK in Connection with Sulphate Plants.
We guarantee promptness, with efficiency for Repairs.
JOSEPH TAYLOR AND CO., CENTRAL PLUMBING WORKS, BOLTON.
Telegrams: SATURATORS, BOLTON. Telephone 0848.

AMMONIACAL Liquor wanted.
CHANCE AND HUNT, LTD., Chemical Manufacturers, OLDBURY, WORCS.
Telegrams: "CHEMICALS."

J. & J. BRADDOCK (Branch of Meters Limited), Globe Meter Works, OLDHAM, and 54 & 47, Westminster Bridge Road, LONDON, S.E.
WET AND DRY GAS-METERS, PREPAYMENT METERS, STATION METERS, AND GOVERNORS.
REPAIRS RECEIVE PROMPT ATTENTION.
Telephones: 815 Oldham, and 2412 Hop, London.
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SPENT OXIDE PURCHASED IN ANY DISTRICT.

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NYMEGEN, HOLLAND.
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KRAMERS AND AARTS WATER-GAS PLANT.
K. & A. WATER-GAS COMPANY, LTD.
39, VICTORIA STREET, S.W.

"HALLITE" Asbestos High-Pressure Sheeting.
HALLITE DOUGLAS, LIMITED, 106, Leadenhall Street, LONDON, E.C.

TO Gas Managers, &c., Wanted, Old Condemned GAS-METERS, from 1-light to 1000-light, for destruction to re-claim Metals. Write for Prices, Stating Quantities and Sizes, and if Wets or Drys. Scrap Metals, Drosses, Metal Shop Sweepings, &c., also bought.
J. WILSON, Pleasant Grove, York Road, King's Cross, LONDON, N.

BRISTOL RECORDING GAUGES AND THERMOMETERS.

J. W. & C. J. PHILLIPS, 23, COLLEGE HILL, LONDON, E.C., and 25, BRIDGE END, LEEDS.

FIDDES-ALDRIDGE
SIMULTANEOUS Discharging-Charger.
The one Machine which Discharges and Charges at One Stroke.
See Advertisement, March 9, p. III. of Centre.
ALDRIDGE AND RANKEN,
39, VICTORIA STREET, WESTMINSTER, S.W.
Telegrams: "MOTORPATHY, LONDON." Telephone: 5118 WESTMINSTER.

SULPHURIC ACID.

SPECIALLY prepared for Sulphate of AMMONIA Makers by
CHANCE AND HUNT, LIMITED,
Works: OLDBURY, WEDNESBURY, AND STAFFORD.
Address Correspondence and Inquiries to OLDBURY, WORCS.
Telegrams: "CHEMICALS, OLDBURY."

"NUGEPE" GAS PLANT CEMENT.
JOHN E. WILLIAMS AND CO.,
LOWER MOSS LANE,
MANCHESTER, S.W.
For all Joints in connection with Oil-Gas Plant and Sulphate Plant.
For all Gas Joints.
For all Tar Joints.
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BALE'S FIRE CEMENT.
PAINT FOR GAS-WORKS.

BALE & CHURCH,
5, CROOKED LANE, LONDON, E.C.

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SPECIALLY prepared for the Manu- facture of SULPHATE OF AMMONIA.
SPENCER CHAPMAN & MESSEL, LTD.,
with which is amalgamated WM. PEARCE & SONS, LTD.
36, Mark Lane, LONDON, E.C. Works: SILVERTOWN.
Telegrams: "HYDROCHLORIC, LONDON."
Telephone: 341 AVENUE.

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CHAIN BELT ENGINEERING CO.
DERBY, ENGLAND,
FOR REALLY HIGH-CLASS
ELEVATORS AND CONVEYORS
ALSO
DRIVING AND CONVEYOR CHAINS.

GAS TAR wanted.
BROTHERTON AND CO., LTD., Tar Distillers.
Works: BIRMINGHAM, GLASGOW, LEEDS, LIVERPOOL, WAKEFIELD, AND SUNDERLAND.

JOHN RILEY & SONS, Chemical Manu- facturers, Hapton, near Accrington, are MAKERS of Special SULPHURIC ACID, for Sulphate of Ammonia Making. Highest percentage of Sulphate of Ammonia obtained from the use of this Vitriol, which has now been used for upwards of 50 Years. References given to Gas Companies.

J. E. C. LORD, Ship Canal Tar Works, Weaste, Manchester. Pitch, Creosote, Benzols, Toluol, Naphtha, Pyridine, all kinds of Cresylic Acid, Carbolic Acid, Sulphate of Ammonia, &c.

AMMONIACAL Liquor wanted.
BROTHERTON AND CO., LTD., Ammonia Distillers.
Works: BIRMINGHAM, GLASGOW, LEEDS, LIVERPOOL, WAKEFIELD, AND SUNDERLAND.

HYDRATED OXIDE OF IRON.
PREPARED from Pure Iron.
Twice as Rich as Bog Ore.
Gives no back Pressure.
The Cheapest in the Market.
READ HOLLIDAY AND SONS, LTD., HUDDERSFIELD.

TAR WANTED.

National Telephone 7002. Telegrams: "UPRIGHT."
Apply, **THOMAS HORROCKS,**
Albert Chemical Works, BRADFORD, MANCHESTER.
Pitch, Creosote, Brick and Fuel Oils, Benzol, Solvent Naphtha, Sulphate of Ammonia.

DESSAU PATENT VERTICAL RETORTS.
FOR list of Installations, see "Journal," March 23, p. I. of Centre.
THE DESSAU VERTICAL RETORT COMPANY,
Care of Mr. CHARLES HUNT, Consulting Engineer,
17, Victoria Street, WESTMINSTER, S.W.

PATENTS AND TRADE MARKS PUBLICATIONS, "MERCHANDISE MARKS ACT, and Decisions thereunder," 1s.; "TRADE SECRETS v. PATENTS," 6d.; "DOCTRINE of EQUIVALENTS, Mechanical and Chemical," 6d.; "SUBJECT-MATTER of PATENTS," 6d.
MEWBURN, ELLIS, & PRYOR, Chartered Patent Agents, 70 & 72, Chancery Lane, London, W.C. Telegrams: "Patent London." Telephone: No. 243 Holborn.

ROBERT DEMPSTER & SONS, Ltd., Contractors for Complete CARBONIZING PLANTS and every description of GAS APPARATUS and ELEVATING and CONVEYING PLANT, Rose Mount Iron-Works, Elland.

AMMONIA. Consumers in any form are invited to correspond with Chance and Hunt, Ltd., Chemical Manufacturers, Oldbury, Worcs.

GAS OILS.

MEADE-KING, ROBINSON, & CO. Represent the Strongest Independent Refineries in America; also Petroleum Spirit for Gas Enrichment. 18, Exchange Street, Manchester, and 11, Old Hall Street, Liverpool.

"GAZINE" (Registered in England and Abroad). A radical Solvent and Preventative of Naphthalene Deposits, and for the Automatic Cleaning of Mains and Services.
It is also used for the enrichment of Gas.
Manufactured and supplied by C. Bourne, West Moor Chemical Works, Killingworth, or through his Agent, F. J. Nicol, Pilgrim House, Newcastle-on-Tyne.
Telegrams: "Doric," Newcastle-on-Tyne. National Telephone No. 2497.

MR. W. B. MIMMACK, for many years Secretary, Manager, and Accountant of the Crays Gas Company (111 Millions), now in Amalgamation, seeks APPOINTMENT in any or all of these Offices.
St. Paul's Cray, Kent.

GENERAL Clerk and Collector desires CHANGE, at Home or Abroad. Thorough knowledge of Gas Companies' Books. Eight Years' Experience. Excellent Testimonials.
Address No. 5076, care of Mr. King, 11, Bolt Court, Fleet Street, E.C.

YOUNG Engineer, G.Inst.Mech.E., Student Institution of Gas Engineers, Trained on thoroughly up-to-date Gas-Works, and having a good Capacity for Business, is open to accept REPRESENTATIVE POSITION on a First-Class Firm of Carbonizing or Lighting Engineers.
Address No. 5079, care of Mr. King, 11, Bolt Court, Fleet Street, E.C.

ADVERTISERS, with Engineering Knowledge and strong Selling Connection and Influence (proof furnished) with London and District Gas Companies, desire HIGH-CLASS AGENCIES from Gas Plant and Appliance Makers not already represented in London. To any Firm so situated, a genuine and unique opportunity is presented.
Address No. 5080, care of Mr. King, 11, Bolt Court, Fleet Street, E.C.

ADVERTISER (son of a well-known Gas Engineer) desires Engagement as MANAGER of Gas-Works. At present with a Company in North Wales. Has had Practical Training on Works, also in Laboratory. Able to prepare Plans and Superintend Construction of Retort-Settings. Studied Engineering and Chemistry at the Polytechnic Engineering School, Regent Street. Moderate Salary only accepted if reasonable prospect of early preferment.
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TO GAS ENGINEERS AND MANAGERS.

ADVERTISER (Age 28), Articled under, and Three Years Chief Assistant to, an Architect, would be prepared to Work hard in any Capacity that afforded reasonable prospects of a satisfactory permanent position. Has had a Wide General Experience, including Mills, Warehouses, Transferring Machinery, Reinforced Concrete, &c., and is thoroughly Competent to prepare Drawings, Specifications, Quantities, &c. Good Draughtsman, Surveyor, and Mechanical Engineer. Unexceptionable References and Testimonials.
Address No. 5078, care of Mr. King, 11, Bolt Court, Fleet Street, E.C.

WANTED, a Young Man as an Im-PROVER to the Gas-Fitting. Wages, £1 per Week.
Apply to the Manager, Gas-Works, Ringwood, Hants.

WANTED, a Young Man Experienced in the Maintenance of all kinds of Incandescent Burners.
Apply, stating Age and Wages expected, with *copies* of References, to the Manager, Gas-Works, Mitcham.

TRAVELLER wanted, who must have had similar Experience, by a Firm of Contractors for Gas Plant.
Applications, by letter, stating Age, Ground Proposed to be covered, and Salary required, to No. 5064, care of Mr. King, 11, Bolt Court, Fleet Street, E.C.

WANTED, an Experienced Solicitor, Earning, or having recently earned, not less than $20 per Week.
Apply, by letter, stating Experience, Salary received, and giving References, to R. C. Ware, Boston Consolidated Gas Company, Boston, Mass.

ASSISTANT Working Foreman re-quired for Stove and Repairing Shops in a Large Suburban Gas Company. Must be a good Mechanic, and capable of controlling Men. Age not to exceed 30. Wages to commence at 40s. per week.
Address No. 5077, care of Mr. King, 11, Bolt Court, Fleet Street, E.C.

WANTED, a Working Foreman, for the West of England, used to Regenerative Settings, Gas and Steam Engines, Exhausters and Works generally, able to Lay Mains and Services, and Fix and Read Meters. Thoroughly Experienced man.
Wages 28s. to 30s. per Week, with House, Coal, and Gas.
Apply, by letter, with References, Age, &c., to No. 5081, care of Mr. King, 11, Bolt Court, Fleet Street, E.C.

BISHOP'S STORTFORD AND DISTRICT GAS COMPANY.

APPOINTMENT OF SECRETARY.

THE Directors invite Applications for the above Appointment. The Company's Sale of Gas for 1908 was 53 Million Cubic Feet.
Commencing Salary, £150 per Annum.
No Applications will be considered except from those having Practical Experience in, and an intimate knowledge of, Gas Accountancy (Double Entry Book-Keeping, Rentals, &c.), and the usual Routine connected with the Secretarial Department.
Applications, to be marked on the outside "Secretaryship," stating Age, Experience, and Qualifications, and accompanied by *copies* of Three Testimonials (which will *not* be returned), to be sent to the Chairman at the undermentioned address not later than April 19, 1909.
The Appointment will be made on the 27th of April.
W. J. Gee,
Secretary.
16, Water Lane,
Bishop's Stortford,
March 29, 1909.

PURIFIERS FOR SALE.

FOR SALE—Four 10-feet Square Puri-fiers, with Dempster's Dry-face Centre-Valve and Connections Complete.
Offers to H. Lees, Gas Office, Hexham.

FOR SALE—Three Purifiers, by Newton, Chambers, and Co., 20 ft. square by 5 ft. deep, planed Joints, 18-inch Valves and Connections, with Bye-Passes, Travelling, and Lifting Gear. In Good Condition. Being Removed for Extension.
Apply to the Secretary, Gas Office, Sutton, Surrey.

FOR SALE, Cheap, the undermentioned
GAS PLANT:—
Kirkham's "STANDARD" WASHER-SCRUBBER to pass 250,000 cubic Feet per diem.
GASHOLDER, 3-Lift, 50 ft. dia., cap. 128,000 c.f.
EXHAUSTERS, 10,000 and 8000 cub. ft. per Hour.
4-inch Cast-Iron Vertical CONDENSER.
Wrought-Iron SCRUBBER, 9 ft. high by 3 ft.
Donkin's VALVES, 12-inch, 10-inch, 6-inch.
Apply to Samuel While and Son, 60, Queen Victoria Street, London, E.C.

CRICKHOWELL GAS-WORKS, NEAR ABERGAVENNY.

THE above Works are For Sale by Private Contract owing to the death of the late Proprietor.
The population of Crickhowell is about 1400; and the Town Public Lamps are supplied from the Works.
For further Particulars, Apply to Vaughan & Harris, Solicitors, Crickhowell.

FALKIRK CORPORATION.
(Gas Department.)

THE Falkirk Corporation have For SALE a 12-inch COWAN WATER-LOADING GOVERNOR, in Good Condition.
Further Particulars may be obtained from the undersigned.
(Signed) Wm. Wilson,
Engineer and Manager.
Gas-Works, Falkirk,
March 18, 1909.

FALKIRK TOWN COUNCIL.
(Gas Department.)

COAL-CONVEYOR FOR SALE.

THE Falkirk Corporation have For SALE a PLATE CONVEYOR, by Dickson and Mann, Armadale, 68 ft. 2½ in. Centres by 1 ft. 6 in. wide, in First-Class Order. Was only in use for Two Years, and Replaced by a larger one. It can deal with 25 Tons of crushed Coal per hour.
Further Particulars can be obtained from the undersigned.
William Wilson,
Engineer and Manager.
Gas-Works, Falkirk,
March 20, 1909.

COUNTY BOROUGH OF WIGAN.
(Gas Department.)

THE Gas Committee invite Tenders for the Supply of STORES over the Year ending on March 31, 1910, as follows:—
(*a*) WROUGHT-IRON TUBE and FITTINGS.
(*b*) BRASS and COPPER TUBE and FITTINGS.
(*c*) LEAD GAS PIPE.
(*n*) CAST MAINS and CONNECTIONS.
(*q*) SULPHURIC ACID.
(*r*) SURPLUS TAR.
Forms of Tender may be obtained from the undersigned.
The Committee do not bind themselves to the acceptance of any Tender.
Tenders, sealed and endorsed with the name of the Article tendered for, to be delivered to Harold Jevons, Esq., Town Clerk, Wigan, on or before Monday, the 19th of April next ensuing.
A Sample of each Article to be forwarded addressed to the Gas Engineer.
Jos. Timmins, M.Inst.C.E.,
Engineer, &c.
Borough Gas-Works,
March 26, 1909.

TO SULPHURIC ACID MAKERS.

THE Corporation of Bury invite TENDERS for the Supply of about 400 Tons of SULPHURIC ACID for the Manufacture of Sulphate of Ammonia, during a period of One Year from the 1st day of May, 1909.
Forms of Tender and Conditions may be obtained upon Application to Mr. H. Simmonds, Engineer and Manager, Gas-Works, Bury.
Sealed Tenders to be sent to the Town Clerk, Bury, not later than Saturday, April 17, 1909.

LINCOLN CORPORATION.
(Gas Department.)

TENDERS FOR COAL.

THE Gas Committee of the Lincoln Corporation invite TENDERS for the Supply of 30,000 Tons of Screened or Unscreened GAS COALS and NUTS, to be delivered during a period commencing the 1st of July, 1909, and terminating the 30th of June, 1910.
Further Particulars and Forms of Tender may be obtained from the undersigned.
Sealed and endorsed Tenders, addressed to the Chairman of the Gas Committee, must be delivered on or before the 17th of April next.
The Committee do not bind themselves to accept the lowest or any Tender.
Jno. Carter,
Manager.
Gas Offices, Lincoln,
March 24, 1909.

CHELTENHAM GASLIGHT AND COKE COMPANY.

TENDERS FOR COAL.

THE Directors are prepared to receive TENDERS for the Supply of 40,000 Tons of Clean, Dry, Fresh-Wrought GAS COALS, delivered free at the Company's Siding on the Midland Railway, Cheltenham, during the period ending the 30th of June, 1910.
Particulars may be obtained from the undersigned.
The Directors do not bind themselves to accept the lowest or any Tender.
Tenders, addressed to the undersigned, must be delivered on or before the 3rd of April next.
By order,
R. O. Paterson,
Engineer and General Manager.
Gas-Works, Cheltenham,
March 20, 1909.

OSWALDTWISTLE URBAN DISTRICT COUNCIL.

THE above Council invite Tenders for the Supply and Erection of Three Settings of REGENERATIVE FURNACES, with Furnace Fittings and Mountings complete, Atmospheric CONDENSERS, Livesey WASHER, Tower SCRUBBER, and Rotary SCRUBBER, at their Gas-Works, Church.
Plans and Specifications of the proposed Works may be obtained on Application to Mr. J. H. Davies, Gas Engineer, Gas-Works, Church, and payment of Two Guineas, which will be returned on receipt of a *bonâ-fide* Tender.
Tenders, endorsed "Gas-Works Extension," must be delivered to me not later than the first post on Thursday, the 8th of April, 1909.
The Council do not bind themselves to accept the lowest or any Tender.
B. T. Westwell,
Solicitor,
Clerk to the Council.
Town Hall, Oswaldtwistle,
March 18, 1909.

ISLE OF THANET GASLIGHT AND COKE COMPANY, MARGATE.

THE Directors of the above Company are prepared to receive TENDERS for the RESETTING, including all Material, Mountings, &c., of Three Beds of Horizontal ⌂ RETORTS.
Further Particulars may be obtained on Application to the undersigned.
The Directors do not bind themselves to accept the lowest or any Tender.
Tenders, endorsed "Retorts," and addressed to the Chairman, to be delivered not later than Wednesday, April 7, next.
By order,
Frank A. Winstanley,
Engineer and Manager.
Offices: The Dane,
Margate, March 25, 1909.

ISLE OF THANET GAS COMPANY, MARGATE.

TENDER FOR COALS.

THE Directors of the Isle of Thanet Gas Company are open to receive TENDERS for One Year's Supply of about 20,000 Tons of COAL—viz., 15,000 Tons of Good Durham GAS COAL, and 5000 Tons of Yorkshire Washed NUTS—such Coal to be delivered in Monthly Quantities at Quayside, Margate, and Unloaded by the Crane provided by the Company into Carts also supplied by them.
The Directors will pay the Pier and Harbour Dues of 1s. 3d. per Ton; but all other Costs and Charges are to be paid by the Vendor.
The Directors do not bind themselves to accept the lowest or any Tender.
Tender Forms can be had on Application to the undersigned, and further Information supplied by the Company's Engineer, Mr. F. A. Winstanley.
Tenders, endorsed "Coal," to be addressed to the Chairman, and sent in not later than Wednesday April 7, 1909.
By order,
Thos. C. Fuller, F.C.I.S.,
Secretary.
Offices: The Dane,
Margate, March 19, 1909.